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(U) ADVISORY GROUP FOR AEROSPACE RESEARCH AND
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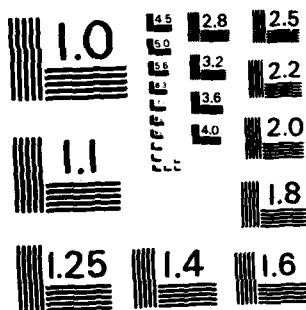
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AGARD BULLETIN

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January 1983

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7 RUE ANCELLE 92200 NEUILLY SUR SEINE FRANCE

Calendar of AGARD Technical Meetings 1983

NORTH ATLANTIC TREATY ORGANIZATION



CALENDAR OF MEETINGS
1983
CALENDRIER DES REUNIONS
1983

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
1-2 March	UNITED STATES (Dayton, Ohio)	Guidance & Control	Lecture Series No. 122 Application of Digital Mapping Technology to Guidance and Control Systems (NATO Secret)
7-8 March	ITALY (Rome)		Cycle de Conférences No. 122 Application de la Technologie de la Cartographie Numérique aux Systèmes de Guidage et de Pilotage (OTAN Secret)
10-11 March	UNITED KINGDOM (London)		
21-25 March	BELGIUM (VKI)	Fluid Dynamics	Special Course on Aerodynamic Characteristics of Controls Cours Spécial sur Les Caractéristiques Aérodynamiques des Gouvernes
23-25 March	FRANCE (Paris)	Headquarters	54th National Delegates Board Meeting 32nd Steering Committee Meeting (NATO Secret) 34th Panel Chairmen Meeting (21-22 March) 13th National Coordinators Meeting 54ème Réunion du Conseil des Délégués Nationaux 32ème Réunion du Comité d'Orientation (OTAN Secret) 34ème Réunion des Présidents de Panels 13ème Réunion des Coordonnateurs Nationaux
10-15 April	UNITED KINGDOM (London)	Structures & Materials	56th Panel Meeting/Specialists' Meeting on a. Aeroelastic Considerations in the Preliminary Design of Aircraft b. Characterization, Analysis and Significance of Defects in Composite Materials 56ème Réunion de Panel/Réunion des Spécialistes sur a. Considérations relatives à l'Aéroélasticité au Stade Préliminaire de la Conception d'un Avion b. La Caractérisation, l'Analyse et les Implications des Défauts des Matériaux Composites
18-22 April	CANADA (Ottawa)	Avionics	45th Panel Meeting/Symposium on Advanced Concepts for Avionics/Weapon System Design, Development and Integration 45ème Réunion de Panel/Symposium sur Les Concepts Avancés d'Etude, de Développement et d'Intégration des Systèmes Electroniques de Bord et des Systèmes d'Armes
18-22 April	FRANCE (Paris)	Aerospace Medical	Specialists' Meeting on Sustained Intensive Air Operations: Physiological and Performance Aspects (NATO Secret) Réunion des Spécialistes sur Les Operations Aériennes Intensives Soutenues considérées sous l'angle de la Physiologie et des Performances (OTAN Secret)
25-29 April	NETHERLANDS (Rotterdam)	Fluid Dynamics	52nd Panel Meeting/Symposium on Aerodynamics of Vortical-Type Flows in Three Dimensions 52ème Réunion de Panel/Symposium sur L'Aérodynamique des Ecoulements Tri- dimensionnels de Type Tourbillonnaire

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>	<i>Dates</i>
2-6 May	BELGIUM (VKI)	Fluid Dynamics	Special Course on Subsonic/Transonic Aerodynamic Interference (Will also be given as a Short Course, in the USA, 16-20 May - Wright-Patterson AFB, Dayton, Ohio.) Cours Spécial sur Les Interférences Aérodynamiques aux Vitesses Subsoniques et Transoniques. (Sera également présenté aux Etats-Unis, Base Aérienne de Wright-Patterson, Ohio, de 16 au 20 mai, sous forme de cours de durée limitée).	20-2 23-2 27-2 5-6
9-20 May	UNITED KINGDOM (Cranfield)	Fluid Mechanics	Special Course on Flight Test Instrumentation Cours Spécial sur Les Instruments des Essais en Vol	8-9 12-1
9-11 May	NORWAY (NDRE Kjeller)	Military Committee Studies	24th Meeting of AASC (NATO Secret) 24ème Réunion de l'AASC (OTAN Secret)	12-1
10-14 May	GREECE (Athens)	Fluid Mechanics	62nd Panel Meeting/Symposium on Flight Mechanics and System Design Lessons from Operational Experience 62ème Réunion de Panel/Symposium sur Les Leçons Tirées de l'Expérience Opérationnelle dans le domaine de la Mécanique du Vol et de la Conception des Systèmes	12-1
16-20 May	FRANCE (Toulouse)	Guidance & Control	36th Panel Meeting/Symposium on Integration of Fire Control, Flight Control and Propulsion Control Systems (NATO Secret) 36ème Réunion de Panel/Symposium sur L'Intégration des Systèmes de Conduite du Tir, de Contrôle du Vol et de Contrôle de la Propulsion (OTAN Secret)	21-2
24-28 May	GERMANY (Oberammergau)	Electromagnetic Wave Propagation	32nd Panel Meeting/Symposium on Propagation Factors Affecting Remote Sensing by Radio Waves (NATO Secret) 32ème Réunion de Panel/Symposium sur Les Facteurs de Propagation Affectant la Détection à Distance par Ondes Radio (OTAN Secret)	26-3
30 May - 3 June	DENMARK (Copenhagen)	Propulsion & Energetics	61st Panel Meeting/Specialists' Meetings on a. Viscous Effects in Turbomachines b. Auxiliary Power Systems 61ème Réunion de Panel/Réunion des Spécialistes sur a. Les Effets de la Viscosité dans les Turbomachines b. Les Groupes Moteurs Auxiliaires	26-3
30-31 May	GREECE (Athens)	Electromagnetic Wave Propagation	Lecture Series No. 127 Modern HF Communications Cycle de Conférence No. 127 Les Communications Modernes à Hautes Fréquences	3-6
2-3 June	ITALY (Rome)			
14-15 June	UNITED STATES (Ft Monmouth, NJ)			3-7
6-7 June	UNITED KINGDOM (London)	Avionics	Lecture Series No. 126 Modern Display Technologies for Airborne Applications Cycle de Conférence No. 126 Les Technologies Modernes d'Affichage pour Applications Aéroportées	3-7
9-10 June	ITALY (Rome)			
16-17 June	UNITED STATES (Ft Monmouth, NJ)			

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<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
20-21 June	NORWAY (Trondheim)	Avionics	Lecture Series No. 129 Speech Processing Cycle de Conférence No. 129 Le Traitement de la Parole
23-24 June	DENMARK (Copenhagen)		
27-28 June	NETHERLANDS (Delft)		
5-6 September	GERMANY (Stuttgart)	Guidance & Control	Lecture Series No. 128 Computer Aided Design and Analysis of Digital G & C Systems Cycle de Conférence No. 128 L'Etude et l'Analyse Automatisées des Systèmes Numériques de Guidage et de Pilotage
8-9 September	GREECE (Athens)		
12-13 September	FRANCE (Paris)		
12-16 September	CANADA (Ottawa)	Technical Information	36th Panel Meeting/Specialists' Meeting on The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information 36ème Réunion de Panel/Réunion des Spécialistes sur La Mise en Oeuvre de Technologies Nouvelles en vue d'Améliorer la Diffusion des Informations Relatives au Domaine Aérospatial et à la Défense
21-23 September	GERMANY (Munich)	Headquarters	55th National Delegates Board Meeting 19th Annual Meeting 33rd Steering Committee Meeting (NATO Secret) 35th Panel Chairmen Meeting (19-20 September) 55ème Réunion du Conseil des Délégués Nationaux 19ème Réunion Annuelle 33ème Réunion du Comité d'Orientation (OTAN Secret) 35ème Réunion des Présidents de Panels
26-30 September	ITALY (Florence)	Guidance & Control	37th Panel Meeting/Symposium on Guidance and Control Techniques for Advanced Space Vehicles (NATO Secret) 37ème Réunion de Panel/Symposium sur Les Techniques de Guidage et Pilotage pour Véhicules Spatiaux de Conception Avancée (OTAN Secret)
26-30 September	TURKEY (Cesme)	Fluid Dynamics	53rd Panel Meeting/Symposium on Wind Tunnels and Testing Techniques 53ème Réunion de Panel/Symposium sur Les Techniques d'Essais et des Souffleries
3-6 October	UNITED KINGDOM (London)	Aerospace Medical	40th Panel Meeting/Symposium on Occupational Medicine in Aviation 40ème Réunion de Panel/Symposium sur La Médecine du Travail dans le domaine de l'Aviation
3-7 October	TURKEY (Cesme)	Propulsion & Energetics	62nd Panel Meeting/Symposium on Combustion Problems in Turbine Engines 62ème Réunion de Panel/Symposium sur Les Problèmes de Combustion des Turbomoteurs
3-7 October	NORWAY (Spatind)	Electromagnetic Wave Propagation	33rd Panel Meeting/Symposium on Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation 33ème Réunion de Panel/Symposium sur Les Caractéristiques de la Basse Atmosphère exerçant une Influence sur la Propagation des Ondes Radio

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
9-14 October	PORTUGAL (Vimeiro)	Structures & Materials	57th Panel Meeting/Specialists' Meeting on Materials Substitution and Recycling 57ème Réunion de Panel/Réunion des Spécialistes sur Le Remplacement et le Recyclage des Matériaux les Matériaux de Substitution et le Recyclage des Matériaux
5-6 October	UNITED STATES (Gaithersburg, Md)	Technical Information	Lecture Series No. 130 Development and Use of Numerical and Factual Data Bases Cycle de Conférences No. 130 Développement et Utilisation des Bases de Données concernant Nombres et Faits
10-11 October	UNITED KINGDOM (London)		
13-14 October	PORTUGAL (Lisbon)		
10-14 October	BELGIUM (Brussels)	Flight Mechanics	63rd Panel Meeting/Symposium on Technology for Sustained Supersonic Cruise and Manoeuvre (NATO Secret) 63ème Réunion de Panel/Symposium sur La Technologie des Croisières et Manoeuvres Prolongées en Régime Supersonique (OTAN Secret)
17-20 October	UNITED STATES (NASA Langley)	Avionics	46th Panel Meeting/Symposium on Space Systems Applications to Tactical Operations (NATO Secret) 46ème Réunion de Panel/Symposium sur Les Applications des Systèmes Spatiaux aux Opérations Tactiques (OTAN Secret)
20-21 October	TURKEY (Ankara)	Electromagnetic Wave Propagation	Lecture Series No. 131 The Performance of Antennas in their Operating Environment Cycle de Conférences No. 131 Fonctionnement des Antennes dans leur Environnement Opérationnel
24-25 October	GREECE (Athens)		
27-28 October	BELGIUM (Brussels)		
14-16 November	NETHERLANDS (The Hague)	Military Committee Studies	25th Meeting of AASC (NATO Secret) 25ème Réunion de l'AASC (OTAN Secret)
14-18 November	NORWAY (Oslo)	Aerospace Medical	Special Course: 7th Advanced Operational Aviation Medicine Course Cours Spécial: 7ème Cours Avancé de Médecine Aéronautique Opérationnelle

Attendance at AGARD Panel Meetings and Lecture Series is by invitation only and is normally limited to citizens of the NATO Nations. Invitations should be sought from an AGARD National Delegate or Panel Member from the applicant's own country. The names and addresses of National Delegates and Panel Members will be found in Section III of AGARD Bulletin 83-1.

L'assistance aux Réunions des Panels et aux Séries de Conférences de l'AGARD est normalement réservée aux personnes munies d'une invitation et, en règle générale, aux citoyens des pays membres de l'OTAN. Les demandes d'invitation sont à adresser à un Délégué National ou à un Membre du Panel concerné. Les noms et adresses des Délégués Nationaux et des Membres des Panels, figurent dans la 3ème Partie du Bulletin 83-1 de l'AGARD.



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AGARD BULLETIN

MEETINGS • PUBLICATIONS • MEMBERSHIP

JANUARY 1983

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THE MISSION OF AGARD

The mission of AGARD is to bring together the leading personalities of the NATO nations in the fields of science and technology relating to aerospace for the following purposes:

- Exchanging of scientific and technical information;
- Continuously stimulating advances in the aerospace sciences relevant to strengthening the common defence posture;
- Improving the co-operation among member nations in aerospace research and development;
- Providing scientific and technical advice and assistance to the North Atlantic Military Committee in the field of aerospace research and development;
- Rendering scientific and technical assistance, as requested, to other NATO bodies and to member nations in connection with research and development problems in the aerospace field;
- Providing assistance to member nations for the purpose of increasing their scientific and technical potential;
- Recommending effective ways for the member nations to use their research and development capabilities for the common benefit of the NATO community.

The highest authority within AGARD is the National Delegates Board consisting of officially appointed senior representatives from each member nation. The mission of AGARD is carried out through the Panels which are composed of experts appointed by the National Delegates, the Consultant and Exchange Programme and the Aerospace Applications Studies Programme. The results of AGARD work are reported to the member nations and the NATO Authorities through the AGARD series of publications of which this is one.

Participation in AGARD activities is by invitation only and is normally limited to citizens of the NATO nations.

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PREFACE

AGARD accomplishes its mission through the programmes of the Panels, the Consultant and Exchange Division and the Military Committee Studies Division. The Panel programmes of AGARD are conducted at meetings which are organized as conferences, symposia, specialists meetings, or working group meetings, and planned at business meetings. The Consultant and Exchange Division organizes Lecture Series and Short Courses as well as providing individual consultants to the nations and AGARD Panels. The Military Committee Studies Division organizes and participates in Technology Studies conducted by the Panels and special Aerospace Applications Studies; both types of studies are requested by or through the North Atlantic Military Committee.

→ This AGARD Bulletin contains information on all the planned 1983 AGARD meetings including dates, locations and brief descriptions of their themes. Additional specific information will be provided by means of individual Meeting Announcements which will be distributed by the various Panels. Queries about participation in AGARD meetings can be addressed to the appropriate Panel Members or National Delegates whose names and addresses are listed in Section ~~II~~ of this Bulletin. ↗

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Included in this Bulletin is also a list of all AGARD publications which were issued in 1982, together with their abstracts. Complete listings of all AGARD Publications which appeared since the founding of this agency are included in the AGARD Index of Publications. Information on how AGARD documents may be obtained is given on the back cover of this Bulletin.



R.K. Geiger
Director

SECTION I

1983 AGARD TECHNICAL MEETINGS

- CALENDAR OF AGARD MEETINGS 1983
- SUMMARY OF 1983 MEETING THEMES

Attendance at AGARD Panel Meetings and Lecture Series is by invitation only and is normally limited to citizens of the NATO Nations. Invitations should be sought from an AGARD National Delegate or Panel Member from the applicant's own country. The names and addresses of National Delegates and Panel Members will be found in Section III of this Bulletin.

CALENDAR OF MEETINGS
1983
CALENDRIER DES REUNIONS
1983

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
1-2 March	UNITED STATES (Dayton, Ohio)	Guidance & Control	Lecture Series No. 122 Application of Digital Mapping Technology to Guidance and Control Systems (NATO Secret)
7-8 March	ITALY (Rome)		Cycle de Conférences No. 122 Application de la Technologie de la Cartographie Numérique aux Systèmes de Guidage et de Pilotage (OTAN Secret)
10-11 March	UNITED KINGDOM (London)		
21-25 March	BELGIUM (VKI)	Fluid Dynamics	Special Course on Aerodynamic Characteristics of Controls Cours Spécial sur Les Caractéristiques Aérodynamiques des Gouvernes
23-25 March	FRANCE (Paris)	Headquarters	54th National Delegates Board Meeting 32nd Steering Committee Meeting (NATO Secret) 34th Panel Chairmen Meeting (21-22 March) 13th National Coordinators Meeting 54ème Réunion du Conseil des Délégués Nationaux 32ème Réunion du Comité d'Orientation (OTAN Secret) 34ème Réunion des Présidents de Panels 13ème Réunion des Coordonnateurs Nationaux
10-15 April	UNITED KINGDOM (London)	Structures & Materials	56th Panel Meeting/Specialists' Meeting on a. Aeroelastic Considerations in the Preliminary Design of Aircraft b. Characterization, Analysis and Significance of Defects in Composite Materials 56ème Réunion de Panel/Réunion des Spécialistes sur a. Considérations relatives à l'Aéroelasticité au Stade Preliminaire de la Conception d'un Avion b. La Caractérisation, l'Analyse et les Implications des Défauts des Matériaux Composites
18-22 April	CANADA (Ottawa)	Avionics	45th Panel Meeting/Symposium on Advanced Concepts for Avionics/Weapon System Design, Development and Integration 45ème Réunion de Panel/Symposium sur Les Concepts Avancés d'Etude, de Développement et d'Intégration des Systèmes Electroniques de Bord et des Systèmes d'Armes
18-22 April	FRANCE (Paris)	Aerospace Medical	Specialists' Meeting on Sustained Intensive Air Operations: Physiological and Performance Aspects (NATO Secret) Réunion des Spécialistes sur Les Operations Aériennes Intensives Soutenues considérées sous l'angle de la Physiologie et des Performances (OTAN Secret)
25-29 April	NETHERLANDS (Rotterdam)	Fluid Dynamics	52nd Panel Meeting/Symposium on Aerodynamics of Vortical-Type Flows in Three Dimensions 52ème Réunion de Panel/Symposium sur L'Aérodynamique des Ecoulements Tri- dimensionnels de Type Tourbillonnaire

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
2-6 May	BELGIUM (VKI)	Fluid Dynamics	Special Course on Subsonic/Transonic Aerodynamic Interference (Will also be given as a Short Course, in the USA, 16-20 May - Wright-Patterson AFB, Dayton, Ohio.) Cours Spécial sur Les Interférences Aérodynamiques aux Vitesses Subsoniques et Transoniques. (Sera également présenté aux Etats-Unis, Base Aérienne de Wright-Patterson, Ohio, de 16 au 20 mai, sous forme de cours de durée limitée).
9-20 May	UNITED KINGDOM (Cranfield)	Fluid Mechanics	Special Course on Flight Test Instrumentation Cours Spécial sur Les Instruments des Essais en Vol
9-11 May	NORWAY (NDRE Kjeller)	Military Committee Studies	24th Meeting of AASC (NATO Secret) 24ème Réunion de l'AASC (OTAN Secret)
10-14 May	GREECE (Athens)	Fluid Mechanics	62nd Panel Meeting/Symposium on Flight Mechanics and System Design Lessons from Operational Experience 62ème Réunion de Panel/Symposium sur Les Leçons Tirées de l'Expérience Opérationnelle dans le domaine de la Mécanique du Vol et de la Conception des Systèmes
16-20 May	FRANCE (Toulouse)	Guidance & Control	36th Panel Meeting/Symposium on Integration of Fire Control, Flight Control and Propulsion Control Systems (NATO Secret) 36ème Réunion de Panel/Symposium sur L'Intégration des Systèmes de Conduite du Tir, de Contrôle du Vol et de Contrôle de la Propulsion (OTAN Secret)
24-28 May	GERMANY (Oberammergau)	Electromagnetic Wave Propagation	32nd Panel Meeting/Symposium on Propagation Factors Affecting Remote Sensing by Radio Waves (NATO Secret) 32ème Réunion de Panel/Symposium sur Les Facteurs de Propagation Affectant la Détection à Distance par Ondes Radio (OTAN Secret)
30 May - 3 June	DENMARK (Copenhagen)	Propulsion & Energetics	61st Panel Meeting/Specialists' Meetings on a. Viscous Effects in Turbomachines b. Auxiliary Power Systems 61ème Réunion de Panel/Réunion des Spécialistes sur a. Les Effets de la Viscosité dans les Turbomachines b. Les Groupes Moteurs Auxiliaires
30-31 May	GREECE (Athens)	Electromagnetic Wave Propagation	Lecture Series No. 127 Modern HF Communications Cycle de Conférence No. 127 Les Communications Modernes à Hautes Fréquences
2-3 June	ITALY (Rome)		
14-15 June	UNITED STATES (Ft Monmouth, NJ)		
6-7 June	UNITED KINGDOM (London)	Avionics	Lecture Series No. 126 Modern Display Technologies for Airborne Applications Cycle de Conférence No. 126 Les Technologies Modernes d'Affichage pour Applications Aéroportées
9-10 June	ITALY (Rome)		
16-17 June	UNITED STATES (Ft Monmouth, NJ)		

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
20-21 June	NORWAY (Trondheim)	Avionics	Lecture Series No. 129 Speech Processing Cycle de Conférence No. 129 Le Traitement de la Parole
23-24 June	DENMARK (Copenhagen)		
27-28 June	NETHERLANDS (Delft)		
5-6 September	GERMANY (Stuttgart)	Guidance & Control	Lecture Series No. 128 Computer Aided Design and Analysis of Digital G & C Systems Cycle de Conférence No. 128 L'Etude et l'Analyse Automatisées des Systèmes Numériques de Guidage et de Pilotage
8-9 September	GREECE (Athens)		
12-13 September	FRANCE (Paris)		
12-16 September	CANADA (Ottawa)	Technical Information	36th Panel Meeting/Specialists' Meeting on The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information 36ème Réunion de Panel/Réunion des Spécialistes sur La Mise en Oeuvre de Technologies Nouvelles en vue d'Améliorer la Diffusion des Informations Relatives au Domaine Aérospatial et à la Défense
21-23 September	GERMANY (Munich)	Headquarters	55th National Delegates Board Meeting 19th Annual Meeting 33rd Steering Committee Meeting (NATO Secret) 35th Panel Chairmen Meeting (19-20 September) 55ème Réunion du Conseil des Délégués Nationaux 19ème Réunion Annuelle 33ème Réunion du Comité d'Orientation (OTAN Secret) 35ème Réunion des Présidents de Panels
26-30 September	ITALY (Florence)	Guidance & Control	37th Panel Meeting/Symposium on Guidance and Control Techniques for Advanced Space Vehicles (NATO Secret) 37ème Réunion de Panel/Symposium sur Les Techniques de Guidage et Pilotage pour Véhicules Spatiaux de Conception Avancée (OTAN Secret)
26-30 September	TURKEY (Cesme)	Fluid Dynamics	53rd Panel Meeting/Symposium on Wind Tunnels and Testing Techniques 53ème Réunion de Panel/Symposium sur Les Techniques d'Essais et des Souffleries
3-6 October	UNITED KINGDOM (London)	Aerospace Medical	40th Panel Meeting/Symposium on Occupational Medicine in Aviation 40ème Réunion de Panel/Symposium sur La Médecine du Travail dans le domaine de l'Aviation
3-7 October	TURKEY (Cesme)	Propulsion & Energetics	62nd Panel Meeting/Symposium on Combustion Problems in Turbine Engines 62ème Réunion de Panel/Symposium sur Les Problèmes de Combustion des Turbomoteurs
3-7 October	NORWAY (Spatind)	Electromagnetic Wave Propagation	33rd Panel Meeting/Symposium on Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation 33ème Réunion de Panel/Symposium sur Les Caractéristiques de la Basse Atmosphère exerçant une Influence sur la Propagation des Ondes Radio

<i>Dates</i>	<i>Location</i>	<i>Activity</i>	<i>Type of Meeting/Subject</i>
9-14 October	PORTUGAL (Vimeiro)	Structures & Materials	57th Panel Meeting/Specialists' Meeting on Materials Substitution and Recycling 57ème Réunion de Panel/Réunion des Spécialistes sur Le Remplacement et le Recyclage des Matériaux les Matériaux de Substitution et le Recyclage des Matériaux
5-6 October	UNITED STATES (Gaithersburg, Md)	Technical Information	Lecture Series No. 130 Development and Use of Numerical and Factual Data Bases Cycle de Conférences No. 130 Développement et Utilisation des Bases de Données concernant Nombres et Faits
10-11 October	UNITED KINGDOM (London)		
13-14 October	PORTUGAL (Lisbon)		
10-14 October	BELGIUM (Brussels)	Flight Mechanics	63rd Panel Meeting/Symposium on Technology for Sustained Supersonic Cruise and Manoeuvre (NATO Secret) 63ème Réunion de Panel/Symposium sur La Technologie des Croisières et Manoeuvres Prolongées en Régime Supersonique (OTAN Secret)
17-20 October	UNITED STATES (NASA Langley)	Avionics	46th Panel Meeting/Symposium on Space Systems Applications to Tactical Operations (NATO Secret) 46ème Réunion de Panel/Symposium sur Les Applications des Systèmes Spatiaux aux Opérations Tactiques (OTAN Secret)
20-21 October	TURKEY (Ankara)	Electromagnetic Wave Propagation	Lecture Series No. 131 The Performance of Antennas in their Operating Environment Cycle de Conférences No. 131 Fonctionnement des Antennes dans leur Environnement Opérationnel
24-25 October	GREECE (Athens)		
27-28 October	BELGIUM (Brussels)		
14-16 November	NETHERLANDS (The Hague)	Military Committee Studies	25th Meeting of AASC (NATO Secret) 25ème Réunion de l'AASC (OTAN Secret)
14-18 November	NORWAY (Oslo)	Aerospace Medical	Special Course: 7th Advanced Operational Aviation Medicine Course Cours Spécial: 7ème Cours Avancé de Médecine Aéronautique Opérationnelle

SUMMARY OF 1983 MEETING THEMES

AEROSPACE MEDICAL PANEL

Symposium: Sustained Intensive Air Operations: Physiological and Performance Aspects (Classified)

18-22 April 1983, Paris, France

The ability of men, both aircrew and ground personnel, to perform their duties despite the high physical and mental stresses imposed upon them is a vital factor in determining the ability of NATO Air Forces to operate effectively in war. The generation of high sortie rates over several days and the adoption of protective measures against bacteriological and chemical warfare agents add greatly to the stresses imposed upon all personnel involved in air operations, and special efforts are needed to minimise their effects.

To this end, equipment and procedures are being developed and exercised, and considerable aviation medicine research is being devoted to these areas.

Now is an appropriate time to review progress and to highlight areas where further physiological and human factors research is required.

40th Panel Meeting/Symposium: Occupational and Industrial Medicine in Aviation

3-6 October 1983, London, England.

The symposium will address the effects of non-ionising radiations; the toxicology of hydrazine, paints and carbon fibres; lasers; and the medical and psychological effects of military tasks, as they affect those concerned with aviation.

AVIONICS PANEL

45th Panel Meeting/Symposium: Advanced Concepts for Avionics/Weapon System Design, Development and Integration

18-22 April 1983, Ottawa, Canada

This Multipanel Symposium involves the participation of three other AGARD Panels, FMP, GCP, and FDP. In order to realize the required performance in the development of modern military aircraft, full advantage is taken of the rapid advances in the computer and electronic technologies. Thus, as each new aircraft design depends increasingly on avionics, the overall system becomes more versatile, but also more complex. Modern weapon systems are being structured with more interdependency among subsystems. However, potential maximum benefits of subsystem and weapon system development integration have not yet been realized.

In order to realize the benefits of advanced integration concepts and maintain compatible timescales throughout the subsystems development and test phases, intelligent integrated design concepts and proper coordination of the development program are essential. New design and development strategies should be considered in order to achieve the technical and performance benefits expected of highly advanced and integrated avionics/weapon systems in an economical and timely manner. The applicable design and development concepts being considered as appropriate for presentation and discussion in this meeting are as follows:

- Initiate design in terms of overall system to satisfy operational requirement.
- Conduct parallel design and development activities in all relevant disciplines.
- Retention of design and application flexibility and growth in subsystems by means of appropriate data processing and subsystem inter/intra-communications structure.
- Planning of logistic support elements including reliability, maintainability and supportability as well as life cycle cost considerations.
- Comprehensive integrated ground testing prior to airborne evaluation of the weapon systems.

The objective of this meeting is to exchange information and ideas among the various disciplines involved in weapon system design to the benefit of integrated system development for future defense programs. The meeting is also expected to contribute to a mutual understanding of the tasks of all specialists involved in the realization of integrated weapon systems.

46th Panel Meeting/Symposium: Space Systems Applications to Tactical Operations (Classified)
 17-20 October 1983, NASA, Langley, USA

The advances in space technology and systems during the past two decades have led to the availability of resources which can contribute to increased combat capability and efficiency in tactical military operations. Military communications satellites such as the NATO and SKYNET series and the US COMSATS have demonstrated their effectiveness as elements of military command and control systems. The various weather satellites permit more accurate and more timely weather forecasting and have become important to all military operations. The 18 Satellite Global Positioning System which is currently under development may revolutionize weapon system navigation and guidance over the next decade.

The importance of space assets in supporting tactical operations is gradually becoming better appreciated by the leaders of the R & D community and by military leaders in the NATO countries. However, the full potential of these systems has not yet been realized. The intent of this symposium is to bring into focus and to characterize the attributes of space systems which contribute to the effectiveness of tactical military operations.

The objectives of the meeting are as follows:

- Provide an overview of tactical needs which are effectively addressed by space systems.
- Characterize the various existing and potential space systems with emphasis on those attributes which are most related to tactical needs.
- Assess the advantages and limitations of space systems in supporting combat operations.
- Investigate the interaction of space assets with ground and mobile resources and the consequent operational issues.
- Discuss future trends in space technology and their relationship to evolving combat needs.

ELECTROMAGNETIC WAVE PROPAGATION PANEL

32nd Panel Meeting/Symposium: Propagation Factors Affecting Remote Sensing by Radio Waves (Classified)
 24-28 May 1983, Oberammergau, Germany

Radiowaves are employed for remote sensing over a wide range of frequencies, at least from HF to 100 GHz. HF radars sense both natural and man-made targets over vast areas by bouncing radio waves off the ionosphere. Development of this means of remote sensing has proceeded since the late forties. Early studies concentrated on the mapping of the properties of the ionosphere itself. Later studies have emphasized two applications: (1) the detection and tracking of targets such as aircraft, missiles and ships; and (2) the measurement of sea state. On-going research and development activities continue to improve our capability to deal with ionospheric properties which limit the performance of our systems.

At higher frequencies, particularly in the UHF and SHF bands, satellites and aircraft are used as platforms for remote sensing applications, such as terrain mapping, target detection and location, measurement of ocean currents and wave and wind fields, and measurement of sea ice parameters, using real and synthetic aperture radars. Passive radiometry can also be used for detection of man-made targets and remote sensing of e.g. ocean parameters. Propagation factors which limit the performance of such systems include terrain effects, ionospheric dispersion and irregularities, atmospheric absorption, and weather effects. In some cases best use of the data requires deeper understanding of the interaction of radiowaves with the entities being observed, and of the effect of processing, especially synthetic aperture radar processing of sea images.

Topics for discussion will include:

- (a) Application Areas — target detection/tracking
 - sea state monitoring
 - wind and wave field monitoring, including wake detection
 - terrain mapping
 - measurement of sea ice;
- (b) Propagation limitations to performance;
- (c) System techniques for ameliorating propagation limitations including adaptive concepts and novel processing concepts.

The purpose of this meeting is to review the current status of existing and proposed operational systems from the viewpoint of propagation factors included and strategies for dealing with them. Hopefully this meeting will identify areas in which more research is required to improve the reliability, performance, and cost-effectiveness of operational systems.

33rd Panel Meeting/Symposium: Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation
3-7 October 1983, Spatind, Norway

Radio waves must necessarily travel through the lower atmosphere for any ground or space link where at least one end is near the ground. Consequently, the influence of the lower atmosphere on wave propagation acts on the whole radio spectrum and the influence becomes much greater above 30 MHz. Though all the possible physical phenomena which can influence radio wave propagation are clearly identified, difficulties occur when predicting the effects of these phenomena, mainly due to insufficient knowledge of radio meteorological parameters. Therefore, the objectives of this symposium are:

- To discuss the present knowledge of the meteorological and radiometeorological parameters which may have an influence on terrestrial or earth-space radio links.
- To discuss the various models and the various methods of predicting the effects of these parameters on radio wave propagation.
- To investigate possible methods to overcome the perturbations due to these propagation effects.

FLIGHT MECHANICS PANEL

62nd Panel Meeting/Symposium: Flight Mechanics and System Design Lessons from Operational Experience
10-14 May 1983, Athens, Greece

The aim of this Symposium is to consider the flight mechanics aspects of aircraft accidents or incidents as the basis for new or improved design or operational concepts. Topics to be covered include:

- Methods for reporting and recording operational problems, incidents and accidents, and lessons from the analysis of these data, with particular emphasis on aircraft having recently become operational.
- Lessons drawn from experience in adverse environmental conditions (low visibility, icing, turbulence, etc.).
- Survivability under failure conditions (e.g. failures in fly-by-wire/active control systems, flight techniques for these conditions).
- Man-machine interface - flight deck design and displays, training procedures, aircrew factors in accidents.

This symposium will be unclassified.

63rd Panel Meeting/Symposium: Technology for Sustained Supersonic Cruise and Manoeuvre (Classified)
10-14 October 1983, Brussels, Belgium

Research on aircraft designs during the past decade in NATO nations has been concentrated on improvements at subsonic and transonic speeds. Typically, supersonic flight of current fighters is restricted to short-range dashes. Studies recently made have indicated that there may be value in emphasising also the possibilities of sustained supersonic cruise and manoeuvre performance at speeds of about Mach 2 and beyond for future applications. Potential effectiveness improvements due to supersonic cruise capability may expand attack options and reduce exposure to hostile action. Another application is related to medium range missile air combat which also may benefit from the supersonic cruise capability of the launching aircraft.

The objective of this symposium is to review and report on the current state of the art in technological areas related to sustained supersonic cruise and manoeuvre of aircraft and to consider the technical problems and the additional technology work which would be of most benefit. In view of the past de-emphasis of supersonic flight it is important to consider areas of knowledge and research capability for this speed range that might be falling into neglect. Other Panels will contribute in this review; topics to be addressed will include:

- Experience with sustained supersonic cruise, potential mission advantages, overview of critical technologies.
- Aerodynamics (supersonic cruise configurations, methods, design variables).
- Propulsion (engine requirements, engine/air frame integration).

- Integration and design (structures and materials, discipline interactions, stores carriage and separation, performance trades).

The format will be a 2½ days' symposium, followed by a 1-day workshop for a task team of limited size (including representatives of the other interested Panels) which will assess the state of supersonic cruise and manoeuvre technology and recommend additional effort which might be undertaken in order to assure the option for possible future NATO military applications. The FMP will then meet for a ½ day review and discussion of the workshop report. Members of other Panels will be invited to attend this session.

This symposium will be classified NATO Secret.

FLUID DYNAMICS PANEL

52nd Panel Meeting/Symposium: Aerodynamics of Vortical Type Flows in Three Dimensions

25-29 April 1983, Rotterdam, Netherlands

Associated with flow separations we frequently find vortical type flows. A familiar and classic example is the trailing vortex system behind a lifting wing where the separation occurs at the trailing edge. However, in recent years with the use of large sweep angles, we have become increasingly familiar with vortical flows associated with separations forward of the trailing edge, in particular, those starting at or near the leading edge. A feature of all such flows in three dimensions is that they are frequently well ordered with a defined stable structure and designers have increasingly sought to exploit them in meeting the growing speed and manoeuvre demands on modern aircraft. Strakes and winglets offer good examples of such practice.

However, our understanding of such flows is still rather fragmentary and mainly qualitative or ad hoc, even for such a basic problem as the flow over a wing-tip there is much to be learnt. We need to understand how a vortical flow interacts with the surface from which it is generated and with other surfaces. Whether a vortical flow can be profitably exploited or not depends on its stability and readiness and breakdown; we therefore need to understand the factors that control its stability and the consequences of breakdown. This problem has been subject to some study in the context of trailing vortices and their persistence, but studies should be broadened to cover all important types of vortical flow.

It is intended that the Symposium should provide a "state of the art" review, both experimental and theoretical, of such flows and the scope of current research. It is hoped that it will indicate future areas of profitable research.

53rd Panel Meeting/Symposium: Windtunnels and Testing Techniques

26-30 September 1983, Cesme, Turkey

The Fluid Dynamics Panel held its latest symposium on the subject of Windtunnels and Testing Techniques in 1975. In view of recent intense activities in the field, spurred by the ever-increasing demands for more efficient testing techniques and higher accuracy data, it is considered timely to organize another international symposium on this subject.

The main purpose of the meeting is to provide a review of new facilities and their performance and to present recent results related to their design. Results of work pertaining to windtunnels testing (scale effects, effects of disturbances, etc.) will be reported upon, as well as those on new developments in testing techniques, instrumentation and model design/construction.

Finally, the increasing impact of computer development on windtunnels testing will be addressed.

It is expected that the accent of the meeting will be on subsonic and transonic facilities and testing therein. However, the supersonic and hypersonic regimes will not be excluded.

GUIDANCE AND CONTROL PANEL

36th Panel Meeting/Symposium: Integration of Fire Control, Flight Control and Propulsion Control Systems (Classified)

16-20 May 1983, Toulouse, France

Recent advances in systems concepts allied to new technology have led to the possibility of integrating a variety of systems that have traditionally been separate.

In this symposium, the potential, and problems, of integrating mission critical and flight critical systems will be examined, particularly the various methods of integrating flight control, propulsion control and fire control.

Such integrated systems can be expected to improve the performance of an aircraft in all phases of a mission. During the en route and return phases fuel conservation flight profiles may be available. Prior to an attack energy management profiles will be available to maximise the energy of the attacker and during the attack phase integrated fire and flight control will maximise the firing opportunities. Similar considerations apply to missiles and other unmanned vehicles.

In addition, integration of these control systems is expected to provide enhancements of flight safety by reducing pilot work load. A further improvement in survivability is also to be expected from the use of curved attack profiles in both air to air and air to ground attacks particularly when such systems are coupled to direct force controls or vectored thrust controls.

The symposium will consist of five sessions:

- Integration of fire control systems.
- Integration of propulsion control systems.
- Integration of diagnostics, self-test, built-in-test for flight control, fire control and propulsion.
- Integration of propulsion flight control.
- Integration of fire/flight control.

37th Panel Meeting/Symposium: Guidance and Control Techniques for Advanced Space Vehicles (Classified) 26-30 September 1983, Florence, Italy

Military applications of space for navigation, communication and intelligence impose increasing requirements on spacecraft capacity, orbit control and pointing accuracy. These requirements are to be met for a long active lifetime, with a high survivability and at low cost. As the size of the spacecraft tends to increase with capacity, in the near future large complex space systems will be applied, that require in-orbit assembly and that will result in mechanical flexibility.

To meet the requirements for future spacecraft the performance of existing components, such as actuators and sensors, may be improved or new concepts may be developed. In particular, the use of microprocessors and other data distribution systems would permit multifunctional use of various sensors or information sources to produce effective, survivable systems at low cost. Increasing on-board computing capacity would enable the use of sophisticated software for effective complex spacecraft control. Unique aspects of large spacecraft are the control of the structural configuration in order to achieve a specific pointing accuracy.

The purpose of this symposium is to discuss technical aspects, design characteristics and guidance and control considerations involved in assembly and operations of such systems.

The symposium will consist of six sessions:

- Review of mission requirements and technology issues.
- Sensors, actuators and configurations.
- Control and stabilization techniques.
- Very-long-lifetime satellites, in-orbit reconfiguration.
- Large and flexible spacecraft.
- Simulation, test and performance evaluation.

PROPULSION AND ENERGETICS PANEL

61st (A) Panel Meeting/Specialists' Meeting: Viscous Effects in Turbomachines

1 3 June 1983, Copenhagen, Denmark

The continuous trend towards improved performance in modern engines has led to a need for a deeper understanding of the various mechanisms and sources of viscous losses in compressors and turbines.

Although many loss sources can be identified and are usually separated into profile, secondary, tip clearance and end-wall losses, the interaction and mixing between these viscous phenomena has assumed an increased importance, especially in multistage configurations.

The trend in design of both compressors and turbines towards lower aspect ratios has increased still more the importance of viscous effects leading to internal flows with strong three-dimensional components and which implies a deviation from axisymmetry.

This Specialists' Meeting aims at assembling leading experts and specialists from industry, research institutes and universities in order to establish the latest state-of-the-art in this field.

61st (B) Panel Meeting/Specialists' Meeting: Auxiliary Power Systems

30 31 May 1983, Copenhagen, Denmark

One of the characteristics of modern high-performance aircraft is their high demand for power for electrical, hydraulic or pneumatic subsystems. On-board auxiliary power systems are installed to fulfill this demand. In past years, the design of these systems was primarily determined by the increasing power levels required. For the future, new requirements concerning the economics of auxiliary power generation and the continuous availability of auxiliary power have grown out of the general fuel situation as well as of the advent of new technologies, like fly-by-wire and active control technology. The latter also underline the need for provision of emergency power. The increasing use of electronics and avionics on board of aircraft gives rise also to increasing cooling requirements, which must be taken care of by auxiliary power systems.

For the provision of auxiliary power various technical systems have been developed, new solutions are in discussion. It is the purpose of the meeting to review the current state-of-the-art, to exchange experiences, and to discuss future problems of auxiliary power generation.

62nd Panel Meeting/Symposium: Combustion Problems in Turbine Engines

3-7 October 1983, Cesme, Turkey

Combustion is a problem which is regularly reviewed by the Propulsion and Energetics Panel, the last time in a Specialists' Meeting in October 1979 under the aspect of combustor modelling. In October 1983, it will be discussed more generally in a Symposium with a broad scope but with emphasis on fuels. It will include: new problems and results on combustion research, and results on combustion stability; distribution of mixture in low pollution and multifuel combustors; combustion problems with alternative jet engine fuels; combustion of highly aromatic fuels; deflagration-detonation transition in pre-mixed gases.

The Symposium will be divided into six sessions: fuels research, fuel effects in main burners; fuel preparation; kinetics and soot formation; liner cooling and traverse quality, and detailed modelling for main burners.

STRUCTURES AND MATERIALS PANEL

56th Panel Meeting/Specialists' Meetings: Aeroelastic Considerations in the Preliminary Design of Aircraft.

Characterization, Analysis and Significance of Defects in Composite Materials

10-15 April 1983, London, United Kingdom

A number of converging technologies are currently influencing the aircraft designer in his search for an optimum structure. For example, the ability to use to advantage the directional properties of composite materials links with techniques such as aeroelastic tailoring, structural optimisation and large scale analytical modelling to allow the design of minimum weight structure which will deform under load in beneficial ways. Moreover, the advent of modern techniques permits the influencing of a design from the preliminary stages onward. The meeting will review current trends in aircraft design with especial reference to aeroelastic behaviour, both favourable and unfavourable, with the aim of speeding the introduction and utilisation of the new technologies.

As with other structural materials, composites can suffer from a loss of integrity either through defects initiated during the production process or from damage sustained in service. The current approach of both aircraft manufacturers and operators is to sidestep the problem by discarding suspect components; this is a severe policy leading to the rejection of components at levels of confidence well below those which seem reasonable. The meeting will consider the latest advances in non-destructive inspection methods and mechanical analysis, and from there attempt to define bounds for acceptability, reparability and rejection.

57th Panel Meeting/Specialists' Meeting: Materials Substitution and Recycling
9-14 October 1983, Vimeiro, Portugal

Few nations are totally independent in the matter of materials supply; in particular, the possibility of sudden dislocations to the flow of those rarer materials demanded by aerospace industries has emphasized the need to consider the initial use of substitute materials and the feasibility of developing alloys which might be tolerant of recycling. At the same time it is necessary to have regard to associated production processes and the practicalities of setting up new techniques. The situation has especial relevance to aeroengine production. The meeting will review the nature of the problem, examine the prospects for the substitution of and recycling of valuable materials, and, through discussion, stimulate the development of appropriate technologies.

TECHNICAL INFORMATION PANEL

36th Panel Meeting/Specialists' Meeting: The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information
12-16 September 1983, Ottawa, Canada

The prime objective of the TIP 1983 Specialists' Meeting is to review new techniques, practices, and equipment relating to communication networks and information delivery systems and to discuss how these are being, or can be, applied to increase the effectiveness of programme managers, engineers, and scientists.

Attention will be directed particularly to the interconnecting of data bases and information centres within communications systems which will permit the retrieval and delivery of separate pieces of information for aggregation and post-processing by end-users. Other matters to be dealt with are ways and means by which intelligent terminals, micro- and mini-computers can be used in the actual aggregation and post-processing tasks. Examples of how the new technologies, etc., can improve the decision-making capability and increase the productivity of scientists and engineers will be provided.

A Lecture Series on 'Development and Use of Numerical and Factual Data Bases' is also proposed by the Panel for 1983.

LECTURE SERIES

Following the proposals made by the AGARD Panels, the Consultant and Exchange Programme proposes to implement the six Lecture Series approved for 1983 by the National Delegates Board in March 1982 and, in addition, the classified GCP Lecture Series, LS 122, which was approved in March 1981 for presentation in September 1982. The NDB having considered the difficulties encountered in the organization of this classified Lecture Series decided that it should be held early in 1983, but on the 1982 budget.

Due to the large number of requests received from the NATO nations it is proposed to hold LS 122 at three locations (USA, UK, and Italy, in March 1983), and the six Lecture Series on the 1983 budget at eighteen locations.

The six Lecture Series proposed in the 1983 budget are described in the following text.

Lecture Series No. 126: Modern Display Technologies for Airborne Applications (with the Avionics Panel)

6-7 June 1983, London, UK
 9-10 June 1983, Rome, Italy
 16-17 June 1983, Fort Monmouth, NJ, USA

The objective of the lectures will be to familiarize the participants with the human factors involved, the cockpit environment problems, and to present the state-of-the-art in the areas of CRT's and VFD's, LCD's, LED's and EL, other displays and to discuss applications. The Lecture Series Director will chair a round-table discussion at the end of the presentations during which comments and suggestions will be expected from participants.

Lecture Series Director: Dr G.H. Hunt (UK).

Lecture Series No. 127: Modern HF Communications (with the Electromagnetic Wave Propagation Panel)

30-31 May 1983, Athens, Greece
 2-3 June 1983, Rome, Italy
 14-15 June 1983, Fort Monmouth, NJ, USA

The sophistication of satellite communications and the vulnerability of satellites from the military point of view has lead to a reassessment of HF and a renewal of interest in this portion of the radio spectrum.

The state-of-the-art in microprocessors, synthesizers and other equipments has lead to the belief that HF communications can be adaptive without going beyond presently developed components.

The Lecture Series will examine the present state-of-the-art of HF. General military requirements will be outlined. Remote areas beyond the line of sight need and use HF. Systems configurations will be discussed.

The Lecture Series Director will chair a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J. Aarons (US).

Lecture Series No. 128: Computer-Aided Design and Analysis of Digital Guidance and Control Systems (with the Guidance and Control Panel)

5-6 September 1983, Stuttgart, Germany
 8-9 September 1983, Athens, Greece
 12-13 September 1983, Paris, France

This Lecture Series is intended to provide the basic concepts, theories and computer methods involved in the design of advanced guidance and control systems.

The degree of advantages in the application of modern microprocessor technologies is already largely affected by the way corresponding systems are designed in the very early stage of a development programme.

It is intended to perform a comprehensive review of direct digital analysis and synthesis procedures, furthermore, an intricate part of this Lecture Series would be computer aided and graphical techniques that can be employed in preliminary design, synthesis and real-time simulation.

The Lecture Series Director will chair a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J. Wall (US).

Lecture Series No. 129: Speech Processing (with the Avionics Panel)

20-21 June 1983, Trondheim, Norway
 23-24 June 1983, Copenhagen, Denmark
 27-28 June 1983, Delft, The Netherlands

The aim of the lectures will be to familiarize participants with the potential applications of speech processing (and, in particular, the military applications). The Lecture Series will present the state-of-the-art in the areas of research in speech recognition, isolated word recognition systems, automatic speaker identification, test and evaluation of automatic word recognition systems, and it will discuss applications of speech processing to avionics.

Lecture Series Director: Dr J. Brindle (UK).

Lecture Series No. 130: Development and Use of Numerical and Factual Data Bases (with the Technical Information Panel)

5 6 October 1983, Gaithersburg, Maryland, USA
 10 11 October 1983, London, UK
 13 14 October 1983, Lisbon, Portugal

Numerical and factual data, as sources of information for all levels of aerospace and defence R & D management and staff activity, are becoming increasingly important. These data are necessary to support research and engineering efforts in all fields. They are also becoming increasingly important to support or assist in the decision-making process. Today, a number of numerical data bases are available through national information centres and others are available from academic or commercial information sources. Data in many of these data bases can be retrieved and manipulated in display systems currently available. There is, however, a great need to improve the quality, reliability, availability, accessibility, dissemination, utilization and management of these data.

Better knowledge regarding the generation and availability of such data bases, and the techniques for their use, will be of benefit to the R & D community and their information service centres.

The scope of the Lecture Series should include:

1. Generation of numerical data.
2. Consideration of the quality and reliability of the data.
3. Methods for publishing and disseminating the data.
4. A review of the data bases that are currently available.
5. How these data bases can be used, and
6. Future needs for numerical data bases.

There will be a round-table discussion at the end of the presentations.

Lecture Series Director: Dr R.F. Taschek (US).

Lecture Series No. 131: The Performance of Antennas in their Operating Environment (with the Electromagnetic Wave Propagation Panel)

20 21 October 1983, Ankara, Turkey
 24 25 October 1983, Athens, Greece
 27 28 October 1983, Brussels, Belgium

Antennas gain in any direction, and the effect of the operating environment on this parameter is fundamentally important for the performance of radio systems. Yet the effect of the environment on antennas is often overlooked. The performance of the antenna is more usually specified in terms of its operation over a perfectly conducting flat ground plane.

This Lecture Series will cover: techniques for measurement/prediction (numerical and experimental modelling); performance of fixed and transportable antennas (terrain effects, masts and buildings effects, re-radiation by supporting towers); performance of mobile antennas (effects of supporting platforms such as aircraft, ships and automobiles); performance of antennas in plasmas.

This Lecture Series will be coordinated with AVP who may have an interest in the prediction of antenna radiation patterns and radar backscatter for complicated bodies such as aircraft, targets, and the earth surface.

There will be a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J.S. Belrose (Canada).

Lecture Series No. 122: Application of Digital Mapping Technology to Guidance and Control Systems (Classified) (with the Guidance and Control Panel)

1 2 March 1983, Wright-Patterson AFB, Ohio, USA
 7 8 March 1983, Rome, Italy
 10 11 March 1983, London, UK

The Lecture Series is intended to address the theoretical analysis, functional and implementation techniques involved in the application of Digital Mapping Technology to guidance and control systems. Areas that will be addressed are computer-generated information requirements, methods of integrating positioning systems and the computation requirements associated with guidance and control integration. Emphasis will be placed upon the analysis, functional and simulation techniques to provide the necessary informational and functional capabilities. New procedures in analysis and estimation techniques will be stressed. This will provide one document which covers the necessary design background and state-of-the-art involved in the application of advancing technologies.

Lecture Series Director: Dr T.E. Perfitt (US).

LECTURE SERIES PUBLICATIONS – 1983

<i>Lecture Series No.</i>	<i>Panel</i>	<i>Title</i>	<i>Projected Publications Date</i>
LS 126	AVP	Modern Display Technologies for Airborne Applications	April
LS 127	EPP	Modern HF Communications	May
LS 128	GCP	Computer-Aided Design and Analysis of Digital Guidance and Control Systems	August
LS 129	AVP	Speech Processing	May
LS 130	TIP	Development and Use of Numerical and Factual Data Bases	September
LS 131	EPP	The Performance of Antennas in their Operating Environment	September
LS 122	GCP	Application of Digital Mapping Technology to Guidance and Control Systems	March (on 1982 budget)

SPECIAL COURSES

In 1983 the Consultant Programme will also support four Special Courses:

– **AMP – The 7th Advanced Operational Aviation Medicine Course**

The Advanced Operational Aviation Medicine Courses have been organized every two years since 1969.

In 1983 the Course will be organized in Norway, 14–18 November.

Course Director: Dr ANDERSEN (Norway).

– **FMP – Special Course on Flight Test Instrumentation**

In 1975 the FMP sponsored a Course on Flight Test Instrumentation (FTI) in the UK at Cranfield Institute of Technology (CIT). The aim of the course was to provide FTI engineers with both the theory and practical applications of instrumentation techniques; and class-room instruction was enhanced by flight experience in the CIT laboratory aircraft.

The Course was repeated in 1977 at DFVLR Braunschweig, with the support of the CIT aircraft and staff; and again at Cranfield in 1977; and at Delft University of Technology (DUT) in 1981 with the support of the CIT aircraft and staff.

In 1983 the Course will be organized at Cranfield, 9–20 May 1983. Funding from the AGARD Consultant and Exchange Programme will support four to six lecturers. The remaining costs will be met by a course fee paid by each participant.

Course Director: Dr M.E. ESHELBY (UK).

– **FDP – Special Course on Aerodynamic Characteristics of Controls**

This Special Course will be given in Belgium at the von Kármán Institute (VKI), 21–25 March 1983.

The Course Director will be: Professor A.D. YOUNG (UK).

– **FDP – Special Course on Subsonic/Transonic Aerodynamic Interference for Aircraft**

This Special Course will be given in Belgium at the von Kármán Institute, 2–6 May 1983.

The Course will also be requested by the US as a Short Course and will be given at Wright Patterson Air Force Base, Dayton, Ohio, on 16–20 May 1983.

The Course Director will be: Dr H. YOSHIHARA (US).

MILITARY COMMITTEE STUDIES

24th Meeting of the Aerospace Applications Studies Committee (Classified)
9-11 May 1983, Oslo, Norway

The Committee will hold the initial review of AAS-18 "Attack and Defence of Helicopters Conducting Tactical Operations" and the second review of AAS-17 "Options for Future Interceptor Weapon Systems". Terms of reference for AAS-19 and 20 will be finalized and the organization of AAS-19 will be established. This will be a NATO-Secret meeting.

25th Meeting of the Aerospace Applications Studies Committee (Classified)
14-16 November 1983, The Hague, Netherlands

The second review of AAS-18 "Attack and Defence of Helicopters Conducting Tactical Operations" and the initial review of AAS-19 will be accomplished. Proposals for new Aerospace Applications Studies will be reviewed and their Terms of Reference refined as required. The organization for the AAS-20 Study Group will be established. Terms of Reference for AAS-20 will be finalized. This will be a NATO-Secret meeting.

SECTION II

1982 AGARD PUBLICATIONS

- 1982 AGARD PUBLICATIONS, BY SERIES
- ABSTRACTS OF 1982 AGARD PUBLICATIONS, BY PANEL OR ACTIVITY

ABBREVIATIONS

AMP	AEROSPACE MEDICAL PANEL
AVP	AVIONICS PANEL
EPP	ELECTROMAGNETIC WAVE PROPAGATION PANEL
FMP	FLIGHT MECHANICS PANEL
FDP	FLUID DYNAMICS PANEL
GCP	GUIDANCE AND CONTROL PANEL
PEP	PROPULSION AND ENERGETICS PANEL
SMP	STRUCTURES AND MATERIALS PANEL
TIP	TECHNICAL INFORMATION PANEL
MCS	MILITARY COMMITTEE STUDIES
LS	LECTURE SERIES

1982 AGARD PUBLICATIONS, BY SERIES

ADVISORY REPORTS

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
AR73 Volume IV	NIGHT DEVICES FOR FAST COMBAT AIRCRAFT - VOLUME IV: THE APPLICATION OF NIGHT VISION IMAGING SENSORS FOR AIR-TO-GROUND ATTACK AGAINST ARMOUR USING FAST COMBAT AIRCRAFT (Classified)	May	MCS
AR167	AGARD THREE-DIMENSIONAL AEROELASTIC CONFIGURATIONS S.R. Bland	March	SMP
AR169	MODERN DISPLAY TECHNOLOGIES AND APPLICATIONS D. Bosman	October	AVP
AR172	FLUID DYNAMICS ASPECTS OF INTERNAL BALLISTICS	November	FDP
AR173	TECHNICAL EVALUATION REPORT on the FLUID DYNAMICS PANEL SYMPOSIUM on AERODYNAMICS OF POWER PLANT INSTALLATION W.P. Henderson	June	FDP
AR174	WINDTUNNEL CAPABILITY RELATED TO TEST SECTIONS, CRYOGENICS AND COMPUTER-WIND-TUNNEL INTEGRATION	April	FDP
AR176	COPYRIGHT: 1971-1981 R.J. Millen	January	TIP
AR177 Volume I	POSSIBILITES DE DELIVRER AVEC PRECISION DES MISSILES "AIR-SOL" A LONGUE DISTANCE, A BASSE ET HAUTE ALTITUDE (Classified)	May	MCS
AR178	DISTRIBUTED MICRO-PROCESSOR APPLICATIONS TO GUIDANCE AND CONTROL SYSTEMS L.J. Urban	July	GCP
AR179	TECHNICAL EVALUATION REPORT on the FLIGHT MECHANICS PANEL SYMPOSIUM on COMBAT AIRCRAFT MANOEUVRABILITY (Classified) W.J.G. Pinsker	May	FMP
AR181 Volume I	ALTERNATIVE JET ENGINE FUELS - Executive Summary R.B. Whyte (Editor)	July	PEP
AR181 Volume II	ALTERNATIVE JET ENGINE FUELS - Main Report R.B. Whyte (Editor)	July	PEP
AR183	TECHNICAL EVALUATION REPORT on the SPECIALISTS' MEETING on DYNAMIC ENVIRONMENTAL QUALIFICATION TECHNIQUES H.W. Magrath	July	SMP
AR184	WIND TUNNEL FLOW QUALITY AND DATA ACCURACY REQUIREMENTS F. Steinle and E. Stanewsky; R.O. Dietz (Editor)	November	FDP
AR185	HF COMMUNICATIONS - PRESENT USAGE, FUTURE NEEDS (Classified) J. Aarons	October	EPP
AR186	TECHNICAL EVALUATION REPORT ON CRITERIA FOR HANDLING QUALITIES OF MILITARY AIRCRAFT R.J. Woodcock	October	FMP

ADVISORY REPORTS (Continued)

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
AR187	TECHNICAL EVALUATION REPORT on the AGARD FLUID DYNAMICS PANEL SYMPOSIUM on FLUID DYNAMICS OF JETS WITH APPLICATIONS TO V/STOL B.M. Spee	July	FDP
AR196 Volume 1	POSSIBILITIES FOR REDUCING RADAR, INFRARED, ACOUSTIC AND OTHER SIGNATURES OF AN AIR VEHICLE – Executive Summary (Classified)	November	MCS
AR196 Volume 2	POSSIBILITIES FOR REDUCING RADAR, INFRARED, ACOUSTIC AND OTHER SIGNATURES OF AN AIR VEHICLE – Main Report (and Appendices) (Classified)	November	MCS
AR197 Volume 1	MISSION APPLICATIONS FOR V/STOL COMBAT AIRCRAFT – Executive Summary (Classified)	December	MCS
AR197 Volume 2	MISSION APPLICATIONS FOR V/STOL COMBAT AIRCRAFT – Main Report (and Appendices) (Classified)	December	MCS
AR198	TECHNICAL EVALUATION REPORT on the SPECIALISTS' MEETING on AIRCRAFT DYNAMIC RESPONSE TO DAMAGED AND REPAIRED RUNWAYS K. Koenig	November	SMP

REPORTS

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
R693	CRITICAL METALS – CONSERVATION, RECYCLING AND SUBSTITUTION E.F. Bradley	January	SMP
R695	AN AGARD-COORDINATED CORROSION FATIGUE COOPERATIVE TESTING PROGRAMME R.J.H. Wanhill and J.J. De Luccia	February	SMP
R702	COMPENDIUM OF UNSTEADY AERODYNAMIC MEASUREMENTS	August	SMP
R704	OPERATIONAL LOADS MEASUREMENT AND EVALUATION	September	SMP

AGARDOGRAPHS

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
AG160 Volume 15	GYROSCOPIC INSTRUMENTS AND THEIR APPLICATION TO FLIGHT TESTING B. Stieler and H. Winter	September	FMP
AG235 Volume V	INDEX TO MANUAL OF DOCUMENTATION PRACTICES APPLICABLE TO DEFENCE-AEROSPACE SCIENTIFIC AND TECHNICAL INFORMATION T. Norton	February	TIP
AG250(E)	PHYSIOPATHOLOGY AND PATHOLOGY OF SPINAL INJURIES IN AEROSPACE MEDICINE R.P. Delahaye, R. Auffret et al.	February	AMP
AG256	ADVANCES IN THE TECHNIQUES AND TECHNOLOGY OF THE APPLICATIONS OF NONLINEAR FILTERS AND KALMAN FILTERS C.T. Leondes	March	GCP

AGARDOGRAPHS
(Continued)

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
AG266	APPLIED COMPUTATIONAL TRANSONIC AERODYNAMICS T.L. Holst, J.W. Slooff, H. Yoshihara, W.F. Ballhaus B.M. Spee and H. Yoshihara (Editors)	August	FDP
AG270(E)	SLEEP AND WAKEFULNESS: HANDBOOK FOR FLIGHT MEDICAL OFFICERS A.N. Nicholson and B.M. Stone	March	AMP
AG275	HUMAN FACTORS IN AIR TRAFFIC CONTROL V.D. Hopkin	April	AMP
AG277(FR)	TECHNIQUES NON-SANGLANTES DE L'EXPLORATION CARDIO-VASCULAIRE: INTERET EN MEDECINE AEROSPATIALE R. Carré	May	AMP

CONFERENCE PREPRINTS (CPP) & CONFERENCE PROCEEDINGS (CP)

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
CP305	MEDIUM, LONG AND VERY LONG WAVE PROPAGATION (AT FREQUENCIES LESS THAN 3000 KHZ) J.S. Belrose (Editor)	February	EPP
CP306	IMPACT OF ADVANCED AVIONICS TECHNOLOGY ON GROUND ATTACK WEAPON SYSTEMS	February	AVP
CP306 (Supp.)	IMPACT OF ADVANCED AVIONICS TECHNOLOGY ON GROUND ATTACK WEAPON SYSTEMS (Classified)	February	AVP
CP307	RAMJETS AND RAMROCKETS FOR MILITARY APPLICATIONS	March	PEP
CP307 (Supp.)	RAMJETS AND RAMROCKETS FOR MILITARY APPLICATIONS (Classified)	March	PEP
CP308	FLUID DYNAMICS OF JETS WITH APPLICATIONS TO V/STOL	January	FDP
CP314	GUIDANCE AND CONTROL TECHNOLOGY FOR HIGHLY INTEGRATED SYSTEMS	February	GCP
CP314 (Supp.)	GUIDANCE AND CONTROL TECHNOLOGY FOR HIGHLY INTEGRATED SYSTEMS (Classified)	April	GCP
CP317	MAINTENANCE IN SERVICE OF HIGH TEMPERATURE PARTS	January	SMP
CP319 (Supp.)	COMBAT AIRCRAFT MANOEUVRABILITY (Classified)	March	FMP
CP320	PRECISION GUIDED MUNITIONS. TECHNOLOGY AND OPERATIONAL ASPECTS	September	GCP
CP320 (Supp.)	PRECISION GUIDED MUNITIONS. TECHNOLOGY AND OPERATIONAL ASPECTS (Classified)	October	GCP
CP322	IMPACT INJURY CAUSED BY LINEAR ACCELERATION: MECHANISMS, PREVENTION AND COST J.L. Haley, Jr (Editor)	October	AMP
CPP323	PROBLEMS IN BEARINGS AND LUBRICATION	May	PEP
CP323	PROBLEMS IN BEARINGS AND LUBRICATION	August	PEP
CPP324	ENGINE HANDLING	September	PEP

CONFERENCE PROCEEDINGS
(Continued)

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
CP325	ADVANCED CASTING TECHNOLOGY	August	SMP
CP326	AIRCRAFT DYNAMIC RESPONSE TO DAMAGED AND REPAIRED RUNWAYS	August	SMP
CP326 (Supp.)	AIRCRAFT DYNAMIC RESPONSE TO DAMAGED AND REPAIRED RUNWAYS (Classified)	October	SMP
CPP329	ADVANCED AVIONICS AND THE MILITARY AIRCRAFT MAN/MACHINE INTERFACE	April	AVP
CP329	ADVANCED AVIONICS AND THE MILITARY AIRCRAFT MAN/MACHINE INTERFACE	July	AVP
CPP330	SOFTWARE FOR AVIONICS	August	AVP
CPP331	PROPAGATION EFFECTS OF ECM RESISTANT SYSTEMS IN COMMUNICATION AND NAVIGATION	May	EPP
CP331	PROPAGATION EFFECTS OF ECM RESISTANT SYSTEMS IN COMMUNICATION AND NAVIGATION	August	EPP
CP331 (Supp.)	PROPAGATION EFFECTS OF ECM RESISTANT SYSTEMS IN COMMUNICATION AND NAVIGATION (Classified)	November	EPP
CPP332	PROPAGATION ASPECTS OF FREQUENCY SHARING, INTERFERENCE AND SYSTEM DIVERSITY	September	EPP
CP333	CRITERIA FOR HANDLING QUALITIES OF MILITARY AIRCRAFT	June	FMP
CPP334	PREDICTION OF AERODYNAMIC LOADS ON ROTORCRAFT	April	FDP
CP334	PREDICTION OF AERODYNAMIC LOADS ON ROTORCRAFT	September	FDP
CP335	WALL INTERFERENCE IN WIND TUNNELS	September	FDP
CPP336	MISSILE AERODYNAMICS (Classified)	August	FDP
CPP337	USE OF SCIENTIFIC AND TECHNICAL INFORMATION IN THE NATO COUNTRIES	September	TIP

LECTURE SERIES PREPRINTS (LSP) & LECTURE SERIES (LS)

<u>Number</u>	<u>Title/Author/Editor</u>	<u>Publication Date</u>	<u>Activity</u>
LS119	IMAGE PROCESSING TECHNIQUES	May	CPP
LS120	ELECTROMAGNETIC PROPAGATION PROBLEMS IN THE TACTICAL ENVIRONMENT	April	CPP
LSP121	HIGH-ANGLE-OF-ATTACK AERODYNAMICS	February	CPP
LS121	HIGH-ANGLE-OF-ATTACK AERODYNAMICS	December	CPP
LS123	AIRCRAFT FIRE SAFETY	May	CPP
LS124	PRACTICAL CONSIDERATIONS OF DESIGN, FABRICATION AND TESTS FOR COMPOSITE MATERIALS	September	CPP
LS125	HUMAN FACTORS ASPECTS OF AIRCRAFT ACCIDENTS	October	CPP

MISCELLANEOUS

<u>Title</u>	<u>Publication Date</u>	<u>Activity</u>
AGARD BULLETIN 1982/1: MEETINGS, PUBLICATIONS, MEMBERSHIP	March	HQ
AGARD HIGHLIGHTS 1982/1	March	HQ
AGARD CALENDAR OF SELECTED AERONAUTICAL AND SPACE MEETINGS (JULY 1982 - DECEMBER 1983)	June	HQ
AGARD BULLETIN 1982/2	August	HQ
AGARD HIGHLIGHTS 1982/2	August	HQ
AGARD HISTORY 1952-1981	October	HQ
AGARD CALENDAR OF SELECTED AERONAUTICAL AND SPACE MEETINGS (JANUARY 1983 - DECEMBER 1984)	December	HQ

ABSTRACTS OF 1982 PUBLICATIONS, BY PANEL OR ACTIVITY

AEROSPACE MEDICAL PANEL (AMP)

AGARDograph 250 (Eng.)

R.P. Delahaye and R. Auffret et al.
February 1982
338 pages
ISBN 92-835-1415-7

Physiopathology and Pathology of Spinal Injuries in Aerospace Medicine

The state of physiological and medical knowledge of disorders of the spine has greatly advanced since 1970, when AGARDograph No. 140 (devoted to the same problems) was published.

This AGARDograph presents the current views of a group of specialists in the aetiology, diagnosis and prognosis of injuries to the vertebral column resulting from flight in rotary-wing and fixed-wing aircraft and gliders, and from parachuting.

The new publication will be an indispensable aid to the work of the flight surgeon, and equally to all those concerned both with the medical surveillance of flying personnel and with flight safety.

AGARDograph 270 (E)

Group Captain A.N. Nicholson,
OBE, RAF and Barbara M. Stone
March 1982
90 pages
ISBN 92-835-1416-5

Sleep and Wakefulness: Handbook for Flight Medical Officers

The inevitable irregularity of work in aircrew is of concern to both civil and military operations, and this handbook is intended for flight medical officers. The relation between alertness and sleep, the nature of sleep in man and his circadian rhythmicity are described, and these factors are discussed in the setting of shift-work, transmeridian flight and air operations. Disorders of sleep and arousal as they may involve the aeromedical specialist are also covered, and the use of hypnotics discussed.

AGARDograph 275

V. David Hopkin
April 1982
187 pages
ISBN 92-835-1421-1

Human Factors in Air Traffic Control

The author first considers air traffic control systems and human factors in relation to them; man as a system component and the relevance of various human attributes are then discussed. Man's functions in air traffic control are described, together with desirable characteristics of his physical working environment. Having considered what controllers do, their facilities and their working environment it is possible to suggest how they should be selected and trained, what might be desirable attributes in controllers and what they need to know. The relevance of various aspects of their conditions of employment is examined, together with characteristics of the controller as an individual. Questions of measuring controllers and of conducting human factors research on air traffic control problems are then discussed. The human factors aspects of other functions within air traffic control systems are briefly examined and the text concludes with suggestions for progress in applying human factors to air traffic control.

AGARDographie 277 (FR)

R. Carré
Mai 1982
210 pages
ISBN 92-835-2109-9

Techniques Non-Sanglantes De L'Exploration Cardio-Vasculaire: Interet En Médecine Aérospatiale

Les techniques cardiologiques non invasives du fait qu'elles sont non sanglantes, et facilement reproductibles, prennent une place de plus en plus importante dans l'expertise du personnel navigant et dans la recherche de médecine aéronautique ou spatiale.

Les auteurs décrivent ces nouvelles techniques et ce que l'expert aéronautique peut en attendre. Celles-ci peuvent être groupées en trois catégories:

- (1) Les tests usuels d'expertise: électrocardiogramme standard et radiographie cardiaque.
- (2) Les tests complémentaires permettant à l'expert d'affirmer l'intégrité organique ou fonctionnelle de l'appareil cardio-vasculaire:
 - épreuve d'effort,
 - enregistrement continu de l'électrocardiogramme pendant 24 heures suivant la technique Holter,
 - échocardiographie,
 - examen ultrasonique,
 - exploration isotopique.
- (3) Les tests spéciaux:
 - rheoplethysmographie cardiaque,
 - balistocardiographie,
 - table basculante,
 - épreuve du LBNP,
 - test de la centrifugeuse.

Conference Proceedings 322
J.L. Haley, Jr (Editor)
October 1982
530 pages
ISBN 92-835-0317-0

Impact Injury Caused by Linear Acceleration: Mechanisms, Prevention and Cost
Problems dealing with impact injury caused by linear acceleration are covered. Papers cover spinal column injuries caused by g_z (eyeballs down) impact, tensile (eyeballs up) loading of the spinal column, and lower leg injuries, as sustained by front seat occupants in automobile "glance off" impacts at high speed.

Head and neck injury mechanisms are discussed both from a physiological and neurological standpoint. Both helmeted and unhelmeted head impacts are analyzed, and helmet test and evaluation methods are covered. Several papers described accident/injury investigation methods, including a helicopter crash test with instrumented dummies aboard. Injury-preventing hardware is covered; papers include restraint harness slack, "dynamic preload" of the restrained body, testing and evaluation of new shock-absorbing (stroking) helicopter seats, automotive air bag testing, and the use of a "webbing tear" shock absorber on a helicopter crew chief's restraint harness.

The validation of a spinal injury model and a more general kinematics (whole body) model are also discussed. Finally, the cost effectiveness of torso armor was discussed in two papers. The conclusions from this meeting will hopefully be applied for improved impact protection.

AVIONICS PANEL (AVP)

Conference Proceedings 306
February 1982
154 pages
ISBN 92-835-0310-4

Impact of Advanced Avionics Technology on Ground Attack Weapon Systems
These Proceedings are comprised of the unclassified papers presented at the AGARD Avionics Panel Meeting, held in Agheos-Andreas, Greece, 19-23 October 1981. Papers were divided into four sessions, there were 6 papers on Avionics Systems and the Operational Scenario, 8 papers on Avionics in Ground Attack, 9 papers on Avionic Subsystems, and 4 on Avionics for Fire and Forget. This document contains 14 of the papers presented at the Meeting, the remainder are available in the classified supplement along with the discussions which took place, a summary of the Round Table, List of Attendees, and a Summary of the Meeting.

Conference Proceedings 306
(Supplement)
(NATO -Secret)
February 1982
170 pages

Impact of Advanced Avionics Technology on Ground Attack Weapon Systems
These Proceedings are comprised of the classified papers and summary of discussions and the Round Table which took place at the AGARD Avionics Panel Meeting, held in Agheos-Andreas, Greece, 19-23 October 1981. Papers were divided into four sessions, there were 6 papers on Avionics Systems and the Operational Scenario, 8 papers on Avionics in Ground Attack, 9 papers on Avionic Subsystems, and 4 on Avionics for Fire and Forget. This document contains 12 of the papers presented at the Meeting, plus a supplementary paper which could not be presented. The other papers are available in the unclassified portion of the Conference Proceedings.

It also includes a List of Attendees, and an Evaluation Report.

Conference Preprint 329
April 1982
184 pages

Advanced Avionics and the Military Aircraft Man/Machine Interface
Preprints of papers delivered at Meeting in Blackpool, April 1982.

Conference Proceedings 329
July 1982
358 pages
ISBN 92-835-0315-4

Advanced Avionics and the Military Aircraft Man/Machine Interface
These Proceedings consist of the papers and discussions presented at the Avionics Panel Meeting on "Advanced Avionics and the Military Aircraft Man/Machine Interface" held in Blackpool, England, 26-29 April, 1982. The 30 papers presented were divided as follows, 3 were introductory, 5 were on Colour Display Systems, 9 were on Voice Input and Output Systems, 6 were on Aircrew Interaction with Complex Systems, and 7 were on Display Technology. The Proceedings also include a Technical Evaluation Report of the Meeting.

Conference Preprint 330
August 1982
276 pages.

Software for Avionics
Preprints of papers delivered at Meeting in The Hague, September 1982.

Advisory Report 169
 Prof. Ir. D. Bosman
 October 1982
 218 pages

ISBN 92-835-1438-6

Modern Display Technologies and Applications

The intent of this AGARD Report is to:

- Analyse both current and anticipated requirements for information displays in military avionics.

Identify display applications where new technologies in visual displays have the greatest impact on military avionics.

- Survey the present status and potential for further development of a wide range of modern display technologies.

An engineering view on vision and displays explains the technical factors affecting the perception of displayed data, sampling and addressing, the human factors affecting display design and use, and the use of color in displays.

A description of technologies includes the cathode ray tube, vacuum-fluorescent tubes, liquid crystal displays, light emitting diodes, electro-luminescent displays, electrochemical displays, and other display technologies. The application of display technologies to military avionics is examined in the areas of classifications, head-up displays, head-down displays, helmet-mounted systems, keyboard displays, and alphanumeric modules. An assessment is made of modern display technology potential.

Reference listings resulting from a comprehensive review of recent work in display technologies are also provided.

ELECTROMAGNETIC WAVE PROPAGATION PANEL (EPP)

Conference Proceedings 305

Dr J.S. Belrose (Editor)
 February 1982
 544 pages
 ISBN 92-835-0311-2

Medium, Long and Very Long Wave Propagation (at Frequencies Less Than 3000 kHz)

These Proceedings include the papers and discussions presented at the AGARD Electromagnetic Wave Propagation Panel Symposium on "Medium, Long and Very Long Wave Propagation (at Frequencies less than 3000 kHz)" held in Brussels, Belgium in September 1981.

The Meeting reviewed propagation information at ELF and VLF frequencies. It was intended to summarize the current state of knowledge in this frequency band in the areas of propagation, antennas, and radio communications technology, with speculation on trends and future use.

There were 37 papers presented, 9 on the propagation medium, 4 on ELF propagation, 6 on VLF propagation, 4 on LF propagation, 4 on MF propagation, 3 on numerical modelling of the propagation medium, and 7 on applications.

Conference Preprint 331

May 1982
 130 pages

Propagation Effects of ECM Resistant Systems in Communication and Navigation

Preprints of papers delivered at Meeting in Copenhagen, May 1982.

Conference Proceedings 331

August 1982
 270 pages
 ISBN 92-835-1432-7

Propagation Effects of ECM Resistant Systems in Communication and Navigation

These Proceedings consist of the unclassified papers presented at the Electromagnetic Wave Propagation Panel Meeting on "Propagation Effects of ECM Resistant Systems in Communication and Navigation" held in Copenhagen, Denmark, 24-28 May, 1982. There were 28 papers presented divided as follows. Seven on propagation limitations to modern systems, five on adaptation of signal characteristics to propagation features, three on propagation effects in typical scenarios of electronic warfare, and thirteen on propagation effects in EW scenarios. The classified supplement contains the discussion, summary of the round table and a summary of the Meeting.

For classified papers, see CP-331 (S).

Conference Preprint 332

September 1982
 190 pages

Propagation Aspects of Frequency Sharing, Interference and System Diversity

Preprints of papers delivered at Meeting in Issy-les-Moulineaux, October 1982.

Advisory Report 185

(NATO-Secret)
 Dr J. Aarons (Editor)
 October 1982
 viii + 38 pages

HF Communications -- Present Usage, Future Needs (Title Unclassified)

This document covers the results of the Electromagnetic Wave Propagation Panel Working Group 01 on HF Communications.

The Group was composed of 15 experts from 9 NATO Nations. It contains a survey of current usage as well as projections and recommendations on future usage and needs.

System architecture, components, and real time improvement are all addressed, based on visits to operating facilities.

Conference Proceedings 331
(Supplement)
(NATO-Confidential)
November 1982
vii + 176 pages

Propagation Effects of ECM Resistant Systems in Communication and Navigation
(Title Unclassified)

These Proceedings include papers and discussions presented at the AGARD/EPP-Symposium on "Propagation Effects of ECM-Resistant Systems in Communication and Navigation (NATO-Secret)" held in Copenhagen, Denmark, in May 1982. The entire subject of the symposium was covered by 28 papers in four sessions, concerning propagation limitations to modern systems, system adaptation to propagation features, propagation effects in electronic warfare scenarios, and general propagation/system interaction. A Round-Table Discussion was used to finally review propagation effects in the various modes of military system applications and possible future development in relevant areas, such as line-of-sight, diffraction and scatter paths, ionospheric propagation (HF) and satellite links.

The Proceedings are published in two parts: one volume with the unclassified papers of the first three sessions, and a special volume with classified papers of the first three sessions, the Session IV "General Propagation/System Interaction", the discussions on all papers, as well as a detailed summary record of the Round-Table Discussion.

FLIGHT MECHANICS PANEL (FMP)

Conference Proceedings 319
(Supplement)
(NATO-Confidential)
March 1982
iv + 100 pages

Combat Aircraft Manoeuvrability

This Supplement contains the classified papers that were presented at the AGARD Flight Mechanics Panel Symposium on Combat Aircraft Manoeuvrability held in Florence, Italy, 5-8 October 1981. The unclassified papers are published in AGARD-CP-319.

The Symposium reviewed the operational requirements for the manoeuvrability, technical prospects for manoeuvrability improvements, and prediction and assessment methods and their value. A comprehensive Technical Evaluation Report on the meeting appears in AGARD Advisory Report No. 179.

Advisory Report 179
(NATO-Confidential)
W.J.G. Pinsker
May 1982
iv + 10 pages

Technical Evaluation Report on the Flight Mechanics Panel Symposium on Combat Aircraft Manoeuvrability

This Report evaluates the AGARD Flight Mechanics Panel Symposium on "Combat Aircraft Manoeuvrability", held from 5-8 October in Florence, Italy. The papers of the Symposium are published as AGARD Conference Proceedings No. 319, Unclassified, and No. 319 (Supplement), Classified NATO Confidential. The present Report gives an overview of the meeting, including brief summaries of the papers and an account of the closing Round Table Discussion, together with conclusions and recommendations.

Conference Proceedings 333
June 1982
336 pages
ISBN 92-835-0313-8

Criteria for Handling Qualities of Military Aircraft

The Proceedings consist of the papers presented at the AGARD Flight Mechanics Panel Symposium on Criteria for Handling Qualities of Military Aircraft held in Fort Worth, US, 19-22 April 1982. Topics covered include: present status of criteria, gains achieved in the Seventies and future prospects, criteria for flight at high angle of attack, special problems and techniques for handling qualities determination.

AGARDograph 160
Volume 15
B. Stieler and H. Winter
September 1982
216 pages
ISBN 92-835-1433-5

Gyroscopic Instruments and their Applications to Flight Testing

This AGARDograph is the 15th of the AGARD Flight Test Instrumentation Series and discusses gyroscopic instruments and their application to flight testing. Gyroscopic instruments are used in flight tests to measure the aircraft angular accelerations and rates, attitude and heading and in combination with accelerometers the linear acceleration, the ground velocity and the position. This volume describes the measuring principles, the technical lay-out and the error behaviour of the sensors and systems used for these measurements: gyroscopes, accelerometers, attitude and heading references and inertial navigation systems. Attention is also given to integrated and hybrid sensor systems, as they are in use in modern instrumentation systems. Examples of actual flight instrumentation systems are described and the requirements for the gyroscopic sensors in these systems are discussed for applications in aircraft stability and control flight tests, in performance tests and in airborne and ground systems calibration and testing.

Advisory Report 186
Robert J. Woodcock
October 1982
21 pages
ISBN 92-835-1437-8

Technical Evaluation Report on Criteria for Handling Qualities of Military Aircraft
This Report evaluates the AGARD Flight Mechanics Panel Symposium on Criteria for Handling Qualities of Military Aircraft, held from 19-22 April in Fort Worth, USA. The papers of the Symposium are published as AGARD Conference Proceedings 333; the present Report gives summaries of papers and the concluding discussion, followed by a coordinating review of the content of the Symposium and observations on the continuing question: Where do we go from here?

FLUID DYNAMICS PANEL (FDP)

Conference Proceedings 308
January 1982
446 pages
ISBN 92-835-0308-2

Fluid Dynamics of Jets with Applications to V/STOL

This volume includes the thirty-one papers presented at the Symposium sponsored by the AGARD Fluid Dynamics Panel in Lisbon, Portugal, on 2-5 November 1981. In addition, a summary of important features of the meeting made by Dr Ir. B.M. Spee is included following the papers. A more comprehensive Technical Evaluation Report will be prepared for publication early in 1982.

Conference Preprint 334
April 1982
240 pages

Prediction of Aerodynamic Loads on Rotorcraft

Preprints of papers delivered at Meeting in London, May 1982.

Advisory Report 174
April 1982
66 pages
ISBN 92-835-1420-3

Windtunnel Capability Related to Test Sections, Cryogenics, and Computer-Wind-Tunnel Integration

The Advisory Report includes the results of six meetings sponsored by the Fluid Dynamics Panel and conclusions drawn from the reports prepared by the meeting chairmen. In each of the three subject areas, meetings were convened in the US and Europe, with the results being combined by the chairmen. Applications of the technology discussed in this report can afford large improvements in windtunnel capability and effectiveness.

Advisory Report 173
William P. Henderson
June 1982
16 pages
ISBN 92-835-1426-2

Technical Evaluation Report on the Fluid Dynamics Panel Symposium on Aerodynamics of Power Plant Installation

The AGARD Fluid Dynamics Panel held its Spring Symposium 1981 on the "Aerodynamics of Power Plant Installation" at Toulouse, France, 11-14 May 1981.

The theme of the Symposium was:

- Powerplant installations involve complex flows, strongly influenced by viscous effects and often with important aerodynamic interactions between the airframe and propulsion system. The introduction of new vehicle propulsion concepts, and new points of emphasis in aircraft and missile design requirements, provide an expanding range of aerodynamic problems which call for both experimental and theoretical study. It is the purpose of the symposium to survey the current and foreseeable aerodynamic problems in powerplant installation and to review recent work which has improved basic understanding or has enhanced prediction and design methods in this field.

Four sessions were held -- combat aircraft intakes, afterbodies and nozzles, testing and analysis techniques, and installation aerodynamics of transport aircraft.

This Technical Evaluation Report includes an evaluation of the state of the art and recommendations for future work in the subject area.

Advisory Report 187
B.M. Spee
July 1982
12 pages
ISBN 92-835-1429-7

Technical Evaluation Report on the AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Applications to V/STOL

This Report presents an evaluation of the papers presented during the AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Applications to V/STOL held 2-5 November in Lisbon, Portugal. General observations on progress in the understanding of the flow phenomena associated with jets are followed by more specific comments related to the five topical sessions of the meeting: Jet Interactions with Neighbouring Surfaces, Jet Structure and Development; Windtunnel Simulation of Flow Field, Forces Moments; Injection and Thrust Augmentation; and Theoretical Models and their Assessment. Conclusions and recommendations for further work drawn from the presentations and discussions at the Symposium are included.

The full text of the 31 papers presented at the Symposium is available as AGARD Conference Proceedings No. 308, (ISBN 92-835-0308-2), published in January 1982.

Conference Preprint 336
August 1982
380 pages

AGARDograph 266
T.L. Holst, J.W. Slooff,
H. Yoshihara and W.F. Ballhaus
B.M. Spee and
Dr H. Yoshihara (Editors)
August 1982
108 pages
ISBN 92-835-1431-9

Conference Proceedings 335
September 1982
228 pages
ISBN 92-835-0321-X

Conference Proceedings 334
September 1982
318 pages
ISBN 92-835-0320-1

Advisory Report 184
F. Steinle and E. Stanewsky
R.O. Dietz (Editor)
November 1982
30 pages
ISBN 92-835-1440-8

Advisory Report 172
November 1982
64 pages
ISBN 92-835-1439-4

Missile Aerodynamics (Classified)

Preprints of papers delivered at Meeting in Trondheim, September 1982.

Applied Computational Transonic Aerodynamics

Development of transonic computational fluid dynamics has moved rapidly during the last decade with progress in numerical mathematics and computer technology. This AGARDograph surveys the state of the art in the early 1980's, providing a foundation upon which improvements can be based. Chapters on: General Theory; Existing Computational Transonic Aerodynamic (CTA) Methods; Viscous Interactions; Computational Procedures in Transonic Design; and Advanced Concepts are included.

Wall Interference in Wind Tunnels

The purpose of the Specialists' Meeting was to bring experimental aerodynamicists together to review and discuss current usage and basic developments for wind tunnel wall corrections. The meeting concentrated upon subsonic and transonic flow wall corrections and included consideration of Reynold's number corrections, wall and support interference, flow quality, and aeroelasticity among others. The meeting was organized into sessions of solid wall, ventilated wall and adaptive wall wind tunnels and a summarizing Round Table Discussion.

Prediction of Aerodynamic Loads on Rotorcraft

A wide range of aerodynamic phenomena contribute to the airloads on rotorcraft, and the accurate prediction of these loads represents a major challenge to the helicopter technical community. This Specialists' Meeting was organized for the purpose of identifying and assessing recent developments in this field. The primary theme of the meeting was the prediction and experimental verification of the steady and unsteady aerodynamic forces on the rotor blades of modern helicopters and related devices, such as wind turbines.

The Meeting consisted of four main sessions that addressed recent advances in rotor airloads prediction methods, including the evolution to the present state of the art, the capabilities and limitations of the current methodology, and the specific areas that need further effort. Nineteen invited papers were presented in the following four sessions: I Rotor Blade Aerodynamic Characteristics; II Wakes and Aerodynamic Interference Effects of Rotorcraft and Wind Turbines; III Rotor Airloads Prediction Programs; IV Experimental Correlations and Verifications.

In addition to the contributing authors, two rotorcraft specialists with broad backgrounds and experience in each of the relevant technical areas were invited to assess and critique the papers in the four sessions and to comment on advances in the state of the art in predictive capability. Written remarks by seven of these Commentators are included in these Proceedings.

At the close of the meeting a short discussion of summary remarks was recorded and is included in the volume.

Wind Tunnel Flow Quality and Data Accuracy Requirements

This Advisory Report includes the results of three meetings sponsored by the Windtunnel Testing Techniques Sub-Committee of the Fluid Dynamics Panel among experts in the subject area. Conclusions and recommendations for future work were drawn by the meeting chairmen. This report is a companion to AGARD Advisory Report AR-174 on "Windtunnel Capability Related to Test Sections, Cryogenics, and Computer-Windtunnel Integration" published April 1982, which reports the results of similar meetings convened on those topics.

Fluid Dynamics Aspects of Internal Ballistics

Increased computer power, new numerical methods, and modern test facilities have led to improved modeling of turbulent events, and particularly in the methods available for analysing and predicting fluid flows in interior ballistics. Six NATO countries contributed to a Working Group charged with verifying the extent to which experts in interior ballistics could take advantage of such progress. Experts in fluid dynamics were consulted, as were authors of various computer codes who provided insight into their objectives and code contents. Chapters deal with the interior ballistics cycle, gaseous outflow from tube launchers, characteristics of propellant gases and specific problems in interior ballistics.

GUIDANCE AND CONTROL PANEL (GCP)

Conference Proceedings 314
February 1982
184 pages
ISBN 92-835-0309-0

Guidance and Control Technology for Highly Integrated Systems

This publication contains the papers presented at the 33rd GCP Symposium on Guidance and Control Technology for Highly Integrated Systems held at the Agios-Andreas Air Force Base, Marathon, Athens, Greece from 13-16 October 1981.

A Keynote address on Operational needs in the European Theatre and 22 papers were presented; papers presented covered the following topics:

- Operational Requirements
- Cooperative/Interdependent System Considerations
- Threat and Target Detection and Identification
- Autonomous Integrated Weapons Systems
- Affordability and Survivability Considerations.

AGARDograph 256
Professor C.T. Leondes, Ph.D.
March 1982
538 pages
ISBN 92-835-1418-1

Advances in the Techniques and Technology of the Application of Nonlinear Filters and Kalman Filters

This AGARDograph addresses recent trends and requirements for the application of advanced filtering technology and techniques. The following topics are covered:

- Advanced topics in nonlinear and linear filters
- Computational techniques in nonlinear and linear filters
- Advanced nonlinear and Kalman filter application techniques and methodologies.

Conference Proceedings 314
(Supplement)
(NATO-Confidential)
April 1982
vi + 148 pages

Guidance and Control Technology for Highly Integrated Systems

This publication is a classified supplement to the AGARD Guidance and Control Conference Proceedings No. 314. The unclassified volume contains 10 papers on the following topics:

- Operational requirements
- Cooperative/Interdependent System Considerations
- Threat and Target Detection and Identification
- Autonomous Integrated Weapons Systems
- Affordability and Survivability Considerations.

Advisory Report 178
Louis J. Urban (Editor)
July 1982
114 pages
ISBN 92-835-1428-9

Distributed Micro-Processor Applications to Guidance and Control Systems

The objectives of Working Group 06 were to obtain a better understanding of microprocessor technology developments, and of architecture configurations for NATO guidance and control systems. A lexicon of terms and nomenclatures is provided as well as considerations on standardization options and opportunities.

This publication, requested by the Guidance and Control Panel of AGARD, comprises four chapters, and is the result of work accomplished by GCP/WG.06 members under Louis J. Urban.

Conference Proceedings 320
September 1982
108 pages
ISBN 92-835-1434-3

Precision Guided Munitions. Technology and Operational Aspects

This publication contains part of the papers presented at the Guidance and Control Panel 34th Symposium on Precision Guided Munitions. Technology and Operational Aspects.

24 papers were programmed covering the following topics:

- Systems analysis
- Supporting technology
- Seeker technology
- Guidance and control
- Weapon developments.

Conference Proceedings 320
(Supplement)
(NATO-Secret)
October 1982
xii + 224 pages

Precision Guided Munitions. Technology and Operational Aspects (Title Unclassified)

This publication is a classified supplement to the AGARD GCP Conference No. 320. It contains most of the papers presented at the 34th GCP Symposium under the following sessions:

- Systems analysis
- Supporting technology
- Seeker technology
- Guidance and control
- Weapon developments.

PROPULSION AND ENERGETICS PANEL (PEP)

Conference Proceedings 307
March 1982
274 pages
ISBN 92-835-0312-X

Ramjets and Ramrockets for Military Applications

The Conference Proceedings contain 32 papers presented at the AGARD Propulsion and Energetics Panel 58th Symposium on Ramjets and Ramrockets for Military Applications which was held in London, United Kingdom, on 26-29 October 1981.

The Technical Evaluation Report is included at the beginning of the Proceedings. Questions and answers of the discussions follow each paper.

The Symposium was arranged into six sessions: Survey Papers (3); Propulsion Systems (6); Inlet Diffusers (5); Interference and Drag Reduction, Engine Testing (5); Combustion, Fuels, Propellants (11); and Integral Booster and Transition (2). A Round Table Discussion followed the sessions.

The aim of the Symposium was to provide a forum for discussions to research scientists and development engineers and to furnish a comprehensive survey on modern ramjet and ramrocket technology and their possibilities in missile propulsion to application experts in government and military staffs.

This volume contains the Unclassified papers, the Classified papers are published in CP 307 Supplement.

Conference Proceedings 307
(Supplement)
(NATO-Confidential)
March 1982
vi + 198 pages

Ramjets and Ramrockets for Military Applications

The Conference Proceedings contain 32 papers presented at the AGARD Propulsion and Energetics Panel 58th Symposium on Ramjets and Ramrockets for Military Applications which was held in London, United Kingdom, on 26-29 October 1981.

The Technical Evaluation Report is included at the beginning of the Proceedings. Questions and answers of the discussions follow each paper.

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The aim of the Symposium was to provide a forum for discussions to research scientists and development engineers and to furnish a comprehensive survey on modern ramjet and ramrocket technology and their possibilities in missile propulsion to application experts in government and military staffs.

Conference Preprint 323
May 1982
280 pages

Problems in Bearings and Lubrication

Preprints of papers delivered at Meeting in Ottawa, May 1982.

Advisory Report 181
Volume I
R.B. Whyte (Editor)
16 pages
July 1982
ISBN 92-835-1422-X

Alternative Jet Engine Fuels – Executive Summary

The Propulsion and Energetics Panel set up Working Group 13 on 'Alternative Jet Engine Fuels' in 1978 to investigate possible properties of future civil and military aviation fuels and their effects on existing and new jet engines. This report discusses the supply and demand situation for kerosine type fuels, suggests properties of an AGARD Research Fuel for future experimental work, and discusses the probable effects of this kind of fuel on present and future engines. Some conclusions have been drawn based on present knowledge and areas requiring further research have been highlighted.

Advisory Report 181
Volume II
R.B. Whyte (Editor)
174 pages
July 1982
ISBN 92-835-1423-8

Alternative Jet Engine Fuels – Main Report

The Propulsion and Energetics Panel set up Working Group 13 on 'Alternative Jet Engine Fuels' in 1978 to investigate possible properties of future civil and military aviation fuels and their effects on existing and new jet engines. This report discusses the supply and demand situation for kerosine type fuels, suggests properties of an AGARD Research Fuel for future experimental work, and discusses the probable effects of this kind of fuel on present and future engines. Some conclusions have been drawn based on present knowledge and areas requiring further research have been highlighted.

Conference Proceedings 323
August 1982
478 pages
ISBN 92-835-0318-9

Problems in Bearings and Lubrication

The Conference Proceedings contain 35 papers and a Keynote Address presented at the AGARD Propulsion and Energetics 59th Symposium on Problems in Bearings and Lubrication which was held in Ottawa, Canada on 31 May - 3 June 1982.

The Technical Evaluation Report is included at the beginning of the Proceedings. Questions and Answers of the discussions follow each paper. The Symposium was arranged into four sessions: Rolling Bearings (5), Lubrication (14), Journal Bearing and Gear Phenomena (6), and Advanced Bearing Applications (10).

The purpose of the Symposium was to provide research scientists, development engineers and application specialists with a broad overview of advanced bearing and lubrication technology with emphasis on high speed bearings suitable for aircraft, missiles and aerospace applications.

Conference Preprint 324
September 1982
222 pages

Engine Handling

Preprints of papers delivered at Meeting in Marathon, October 1982.

STRUCTURES AND MATERIALS PANEL (SMP)

Conference Proceedings 317
January 1982
172 pages
ISBN 92-835-0307-4

Maintenance in Service of High Temperature Parts

All NATO countries need to combat the increasing cost of maintenance of engines and scarcity of strategic materials by improving component utilization. The objective of this Meeting was to review the problem areas and experiences in the maintenance of high temperature parts; many of these problem areas having a common base in relation to service experience and the characteristics of material behaviour, so that users may benefit from the advances in materials science and the future needs for R & D may be identified.

Report 693
E.F. Bradley
January 1982
22 pages
ISBN 92-835-1412-2

Critical Metals – Conservation, Recycling and Substitution

In the recent past there has been increasing concern about disruptions in the price and supply of certain metals – the so-called critical elements – due to inadequate supplies to meet the demand, diminishing reserves, and political action or inaction. This paper broadly reviews the subject, identifying the critical metals relative to their current importance to the aerospace industry. The roles of conservation, recycling, substitution, stockpiling and market place operations are analyzed. New and emerging technologies are discussed relative to their effects on the critical metals, and finally some suggestions are presented for meeting future anticipated material supply problems.

Report 695
R.J.H. Wanhill and J.J. De Luccia
February 1982
82 pages
ISBN 92-835-1413-0

An AGARD-Coordinated Corrosion Fatigue Cooperative Testing Programme

The objectives of the programme are:

- To assess the effectiveness of state-of-the-art protection schemes for aluminium alloys with respect to corrosion fatigue and corrosion + fatigue.
- To stimulate the development of new protection products, procedures and techniques
- To bring researchers on both sides of the Atlantic together in a common testing effort that would result in a better understanding of the corrosion fatigue phenomenon and the means of mitigating it for aerospace structural materials
- To enable participating laboratories to add to their fatigue testing capabilities by using a controlled atmospheric corrosion environment.

Within this context, a core programme was conceived as a two-phase programme of round-robin testing to establish whether participants could obtain confidence in one another's fatigue testing capabilities. At the same time the programme was designed to be sufficiently straightforward to encourage participation particularly by those with relatively little experience of corrosion fatigue testing.

This Report is comprised of the programme manual and a description of the scope and purpose of the core programme, followed by presentation of the results, statistical analysis, discussion and conclusions.

This Programme was sponsored by the Structure and Materials Panel of AGARD.

Advisory Report 167
S.R. Bland
March 1982
18 pages
ISBN 92-835-1417-3

AGARD Three-Dimensional Aeroelastic Configurations

The aeroelastician needs reliable and efficient methods for the calculation of unsteady aerodynamic forces in the frequently critical transonic speed regime. The development of such methods may be enhanced by the availability of a limited number of test cases for the comparison of competing methods. This Report contains such test cases for five clean, isolated wings.

Wing geometric descriptions, airfoil coordinates, and suggested aerodynamic conditions for each are included.

This Advisory Report was sponsored by the Standard Aeroelastic Configurations Working Group of the Structures and Materials Panel.

Advisory Report 183
Howard A. Magrath
July 1982
32 pages
ISBN 92-835-1427-0

Technical Evaluation Report on the Specialists' Meeting on Dynamic Environmental Qualification Techniques

At the 53rd Meeting of the Structures and Materials Panel of AGARD, a Specialists' Meeting on "Dynamic Environmental Qualification Techniques" was held on 28-30 September 1981. It was the purpose of the Specialists' Meeting:

- To review the state-of-the-art of dynamic qualification techniques and test methods presently applied for military aircraft and helicopters, particularly when carrying external stores;
- To exchange technical information in this field between all NATO countries;
- To review the background and intentions of related Military Standards publications;
- To try to formulate a common basis for dynamic structural requirements and substantiation procedures.

In this Technical Evaluation Report, summaries of the 17 papers presented at the Meeting, and published as AGARD CP-318, are given. Some thoughts on these papers are outlined and general suggestions are made with regard to revisions of existing Military Standards and further improvement and standardization of dynamic qualification procedures.

Advisory Report 702
August 1982
196 pages
ISBN 92-835-1430-0

Compendium of Unsteady Aerodynamic Measurements

The Compendium is intended to assist the development of improved methods of predicting transonic unsteady aerodynamics and aeroelastic response by collecting the known unsteady aerodynamic experimental data for the standard AGARD two-dimensional and three-dimensional aeroelastic configurations published in AGARD Advisory Reports 157 and 167 respectively.

Conference Proceedings 326
August 1982
232 pages
ISBN 92-835-0316-2

Aircraft Dynamic Response to Damaged and Repaired Runways

During 1981 and 1982 the AGARD Structures and Materials Panel held two technical meetings on "Aircraft Dynamic Response to Damaged and Repaired Runways". The 1981 meeting focused on the environment of damaged airfields, while the 1982 Specialists' Meeting focused on aircraft dynamic response. The meetings had two main goals: (1) to review the programs and methods within the AGARD countries for dynamic analysis and testing of taxiing aircraft, and (2) to encourage the exchange of information on aircraft dynamic response, thereby improving the interoperability of NATO military aircraft. The publication consists of the papers presented at these meetings.

Conference Proceedings 325
August 1982
344 pages
ISBN 92-835-0314-6

Advanced Casting Technology

Advances in casting technology can lead to a single casting replacing a complex fabrication of wrought components with consequent cost and weight benefits but there is traditionally a reluctance by designers to trust castings. The object of the Specialists' Meeting was to present the current state of development of advanced casting technology, and to bring together designers and materials and processing engineers for a full exchange of views.

The papers presented a comprehensive review of the state of casting technology development, and illustrate the significant advances made over the last few years. It became clear from the discussion that the use of castings, especially aluminium alloy castings, for main structural applications is likely to increase significantly in the near future.

Report 704
September 1982
22 pages
ISBN 92-835-1435-1

Operational Loads Measurement and Evaluation

The Structures and Materials Panel is planning to hold a Specialists' Meeting on advanced operational loads data acquisition concepts in Spring 1984. This subject is considered to divide into two major branches: the first, data acquisition and analysis to confirm design loads; the second, extended analysis for fatigue life determination and monitoring systems development. This Report contains two pilot papers, presented at the Spring 1982 Meeting, which, together, characterize both the division into design loads and fatigue analysis, and differing approaches to the determination of operational loads and structural stresses.

Conference Proceedings 326
(Supplement)
(NATO-Confidential)
October 1982
iii + 10 pages

Aircraft Dynamic Response to Damaged and Repaired Runways (Title Unclassified)

During 1981 and 1982 the AGARD Structures and Materials Panel held two technical meetings on "Aircraft Dynamic Response to Damaged and Repaired Runways". The 1981 meeting focused on the environment of damaged airfields, while the 1982 Specialists' Meeting focused on aircraft dynamic response. The meetings had two main goals: (1) to review the programs and methods within the AGARD countries for dynamic analysis and testing of taxiing aircraft, and (2) to encourage the exchange of information on aircraft dynamic response, thereby improving the interoperability of NATO military aircraft.

Conference Proceedings CP-326 contains the 17 Unclassified papers, this Supplement contains the one Classified paper.

Advisory Report 198
Klaus Koenig
November 1982
16 pages
ISBN 92-835-1441-6

Technical Evaluation Report on the Specialists' Meeting on Aircraft Dynamic Response to Damaged and Repaired Runways

The conclusions of the Meeting were: damaged and repaired runways are likely to be very uneven and possibly dangerous to aircraft operations; there is very little realistic data on the expected amount and extent of the unevenness. With respect to existing NATO aircraft: each aircraft/runway combination must be checked analytically and experimentally; the existing mathematical models for dynamic response of aircraft structures and landing gear are reasonably accurate; some simple modifications to aircraft equipment and pilot technique show substantial improvements in dynamic response. For future aircraft or modifications to the current fleet, there is a need for a NATO-wide "groundworthiness" requirement to allow true *interoperability* of NATO's air forces.

TECHNICAL INFORMATION PANEL (TIP)

Advisory Report 176
Ronald J. Millen
January 1982
36 pages
ISBN 92-835-1411-4

Copyright: 1971-1981

This publication is an update of Mr A.H. Holloway's 1970 work 'A Study of Copyright' (Advisory Report No. 23). It describes developments since that date, concentrating on the situation in the United States of America and the United Kingdom, but including comments on the position in the NATO member nations and several other countries. The emphasis is on *photocopying in libraries and on other matters which directly affect information transfer, such as software and database protection*. Some of the current international developments are mentioned, including the effects of the EEC and the accession of the Soviet Union to the Universal Copyright Convention.

AGARDograph 235
Volume V
Tom Norton
February 1982
42 pages
ISBN 92-835-1414-9

Index to Manual of Documentation Practices Applicable to Defence-Aerospace Scientific and Technical Information

This is the last of the five Volumes which comprise the Manual and indexes the contents of all the preceding Volumes which have been issued on a one-per-year basis over the period 1978-81. The Manual describes the basic documentation practices involved in the initial setting up and operation of an Information-Library organisation to provide defence-aerospace information services. The focus is on a practical, rather than theoretical, approach for both the senior person setting up a new system as well as junior staff who may be using the manual as a training aid.

Conference Preprint 337
September 1982
102 pages

Use of Scientific and Technical Information in the NATO Countries Preprints of papers delivered at Meeting in Rome, September 1982.

LECTURE SERIES

Lecture Series Preprint 121

February 1982

152 pages

High Angle-of-Attack Aerodynamics

Preprints of papers delivered at NASA Langley Research Centre, USA on 10-11 March 1982, at DFVLR, Gottingen, FRG, on 22-23 March 1982 and which formed part of the expanded version sponsored by AGARD and the von Kármán Institute for Fluid Dynamics presented at the VKI, Rhode St Genese, Belgium on 15-19 March 1982.

Lecture Series 120

April 1982

160 pages

ISBN 92-835-1419-X

Electromagnetic Propagation Problems in the Tactical Environment

Modern battlefield activities require an increasing employment of electronic equipment. The large variety of applications extends from communications to surveillance, from reconnaissance to command and control. With regard to efficiency and limitations, many systems depend on the characteristics of the propagation medium and on operational adaptation to the propagation environment.

In order to optimize system performance, operational personnel should possess adequate knowledge of system-relevant propagation criteria, and in addition, a training level which permits an efficient reaction under changeable battlefield conditions. This Lecture Series on Electromagnetic Propagation Problems in the Tactical Environment should be of interest to qualified technical officers and teaching staff, as well as to other personnel qualified in engineering science or natural sciences and connected with tactical electronics of any kind.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Electromagnetic Wave Propagation Panel and the Consultant and Exchange Programme of AGARD presented on 3-4 May 1982 in Munich, Germany and on 6-7 May 1982 in Paris, France.

Lecture Series 119

May 1982

238 pages

ISBN 92-835-1425-4

Image Processing Techniques

This Lecture Series, following an introductory overview of the field and Lecture Series, commenced with a summary on human visual system capabilities and limitations.

Fundamentals of imagery and display were covered, including analog and digital parameters and noise characteristics. Practical aspects included scan conversion, image generation and formatting. A session was devoted to optical image processing, including image enhancement, edge detection, and filtering.

Digital image processing, transmission and coding were covered. Image modeling and bandwidth compression were stressed.

The Lecture Series concluded with a discussion of hardware and applications.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Propulsion and Energetics Panel and the Consultant and Exchange Programme of AGARD, presented on 14-15 June 1982 in Athens, Greece; 17-18 June 1982 in Paris, France and 21-22 June 1982 in The Hague, The Netherlands.

Lecture Series 123

May 1982

180 pages

ISBN 92-835-1424-6

Aircraft Fire Safety

The Lecture Series was based on the results of the AGARD PEP Working Group 11, on the same subject. The results were published in the AGARD Advisory Report No. 132, Volumes I and II. In the presentations, the results were updated and concentrated on the enhancement of passenger and crew fire survivability under aircraft crash conditions. The survivability represents the highest priority of fire safety needs.

The contents covered:

- Aircraft Mishap Experience with respect to Definition of Post Crash Fire Scenario/Survivability Factors
- Availability and Operational Suitability of Aviation Fuels versus Fire Safety Enhancement
- Applicability of Aircraft Subsystems Fire Protection Engineering Techniques for Enhancement of Post Crash Fire Survivability
- Interior Cabin Materials and their Influences on Post Crash Fire Survivability
- Aircraft Post Crash Survivability - Human Response Factors - Physiological, and Psychological.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Propulsion and Energetics Panel and the Consultant and Exchange Programme of AGARD presented on 7-8 June 1982 in Oslo, Norway; on 10-11 June 1982 in London, UK and on 15-16 June 1982 in Washington DC, USA.

Lecture Series 124
 September 1982
 206 pages
 ISBN 92-835-1436-X

Practical Considerations of Design, Fabrication and Tests for Composite Materials

The lectures are directed to the practical application of composites to structures. The scope includes a lecture on design considerations involving material selection, fabrication techniques, and tooling concepts. Stress analysis is covered including knockdown factors, load transfer concepts and analytical techniques. The Lecture Series concludes with a lecture on qualification requirements and practical consideration in inspection and testing techniques. These lectures are not geared to the day-to-day developments at the very forefront of technology, but rather to state-of-the-art concepts, techniques, and materials that when combined will assure a high probability of success in achieving design goals for cost as well as weight savings.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Structures and Materials Panel and the Consultant and Exchange Programme of AGARD presented on 11-12 October 1982 in Oporto, Portugal, 14-15 October 1982 in London, UK, and 18-19 October 1982 in Ankara, Turkey.

Lecture Series 125
 October 1982
 146 pages
 ISBN 92-835-0319-7

Human Factors Aspects of Aircraft Accidents

The lectures reproduced in this publication cover two sub-areas:

- Significant technical background factors:
 A review of those aspects of aeronautical engineering, aviation medicine, physiology, human factors and pathology which are pertinent to accident causation and therefore require investigation.
- The accident investigation process:
 A description of procedures, techniques and problem areas of special interest in the process of conducting an aircraft accident investigation.

Although the scope of the Lecture Series is broad, the focus is on military aviation and on aviation medicine.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Aerospace Medical Panel and the Consultant and Exchange Programme of AGARD, presented on 4-5 November 1982 in Lisbon, Portugal, 8-9 November 1982 in Ankara, Turkey and 11-12 November 1982 in Athens, Greece.

Lecture Series 121
 December 1982
 416 pages
 ISBN 92-835-0322-8

High Angle-of-Attack Aerodynamics

The purpose of this Lecture Series is to review:

- Three-dimensional flows with separation and re-attachment including compressibility effects
- The impact of visualization techniques on understanding complex flows
- The aerodynamic design of modern missiles and fighter aircraft for high angle-of-attack operation
- The status of computational fluid dynamics in the case of large-scale separated three-dimensional flows
- Unsteady aerodynamics and dynamic stability considerations.

The material in this publication was assembled to support a Lecture Series under the sponsorship of the Fluid Dynamics Panel and the Consultant and Exchange Programme of AGARD presented on 10-11 March 1982 at the NASA Langley Research Center, USA, and on 22-23 March 1982 at DFVLR, Göttingen Germany. The publication also includes the additional papers of the expanded version of the series sponsored by AGARD and the von Kármán Institute for Fluid Dynamics which was presented at the VKI, Rhode-Saint-Genèse, Belgium on 15-19 March 1982.

MILITARY COMMITTEE STUDIES (MCS)

Advisory Report 73
 Volume IV
 (NATO-Secret)
 May 1982
 xviii + 310 pages

Night Vision Devices for Fast Combat Aircraft - Volume IV: The Application of Night Vision Imaging Sensors for Air-to-Ground Attack Against Armour using Fast Combat Aircraft

This report examines the utility of television and thermal imaging (FLIR) night vision sensors in a European environment for attacking tanks using fast combat aircraft operating at low level. An hourly meteorological data base for Hannover, FRG is used to generate detailed statistics of the impact of weather over a complete year on typical sensor and aircraft attack system performance, and the methodologies used and developed for mathematical modelling are fully discussed.

Attack effectiveness against planned targets and targets of opportunity is assessed for FLIR sensors of evolutionary performance in the context of the UK's BL 755 cluster, retarded bomb delivered in level flight, but the techniques used can readily be extended or further developed to cover other attack modes and weapons. Important interactions between aircraft conditions, sensor parameters and external constraints, such as terrain screening, are examined, and sensitivity analyses are used to establish the limitations of the simple modelling procedures employed.

This study was conducted in response to a request from the North Atlantic Military Committee under the Management of the Aerospace Applications Studies Committee.

Rapport Consultatif 177
Volume 1
(Secret-OTAN)
Mai 1982
xiv + 38 pages

Possibilités de Délivrer avec Précision des Missiles "Air-Sol" à Longue Distance, à Basse et Haute Altitude

Cette étude évalue les possibilités et l'efficacité des missiles air-sol à longue portée, largués d'avions volant à basse et haute altitudes, pour attaquer de nombreux objectifs fixes et mobiles. Elle évoque en détail les problèmes de guidage. Elle est éditée en deux volumes; le Volume 1 est "une synthèse" et le Volume 2 contient le rapport principal et ses appendices.

Cette étude a été menée suite à une demande de Comité Militaire de l'Atlantique Nord, sous la supervision du Comité Chargé des Etudes de Systèmes en vue d'Applications Aérospatiales, dont Mr H.A. Zwemer est le Président.

Advisory Report 196
Volume 1
(NATO-Secret)
November 1982
xiv + 32 pages

AASC Study No. 13 – Possibilities for Reducing Radar, Infrared, Acoustic and Other Signatures of an Air Vehicle – Volume 1: Executive Summary

This study examines the possibilities of the reduction of the ability of an adversary to observe the presence of an air vehicle by reducing radar, infrared, acoustic, visual, laser and other signatures; the practicability and the penalties in performance, operational utility and cost.

The study group has determined the relative importance of air vehicle designs in terms of probability of detection and recognition. It has explored ways and the practicability of reducing these signatures, and assessed their impact on the air vehicle performance and design. The study also evaluates the penalties in performance, operational utility and cost of these methods.

This Study was conducted in response to a request from the North Atlantic Military Committee, under the management of the Aerospace Applications Studies Committee, Mr H.A. Zwemer, Chairman.

Advisory Report 196
Volume 2
(NATO-Secret)
November 1982
xxi + 183 pages

AASC Study No. 13 – Possibilities for Reducing Radar, Infrared, Acoustic and Other Signatures of an Air Vehicle – Volume 2: Main Report (and Appendices)

The study examines the possibilities of the reduction of the ability of an adversary to observe the presence of an air vehicle by reducing radar, infrared, acoustic, visual, laser and other signatures; the practicability and the penalties in performance, operational utility and cost.

The study group has determined the relative importance of air vehicle designs in terms of probability of detection and recognition. It has explored ways and the practicability of reducing these signatures, and assessed their impact on the air vehicle performance and design. The study also evaluates the penalties in performance, operational utility and cost of these methods.

This Study was conducted in response to a request from the North Atlantic Military Committee, under the management of the Aerospace Applications Studies Committee, Mr H.A. Zwemer, Chairman.

Advisory Report 197
Volume 1
(NATO-Secret)
December 1982
xii + 163 pages

AASC Study No. 14 – Mission Applications for V/STOL Combat Aircraft (Title Unclassified) – Volume 1: Executive Summary

This Report assesses the state of technology and derives design configurations for several categories of V/STOL aircraft concepts which could serve to complement conventional aircraft operations in the mid-nineties. The study is presented in two volumes, Volume 1 is the Executive Summary and Volume 2 contains the Main Report and Appendices.

Advisory Report 197
Volume 2
(NATO-Secret)
December 1982
xii + 163 pages

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This Report assesses the state of technology and derives design configurations for several categories of V/STOL aircraft concepts which could serve to complement conventional aircraft operations in the mid-nineties. The study is presented in two volumes, Volume 1 is the Executive Summary and Volume 2 contains the Main Report and Appendices.

AGARD HEADQUARTERS (HQ)

Bulletin 82/1
March 1982
80 pages

Meetings – Publications – Membership

This issue of the AGARD Bulletin gave a schedule of meetings to be held in 1982, and a directory of AGARD members as of 1 January 1982.

Highlights 82/1
March 1982
36 pages

This booklet is one of a series aimed at establishing a more direct and informal means of communications between members of the AGARD community and their friends in the international aerospace profession. Items for publication are invited from all interested readers, and it is hoped that the Highlights will contain articles on the future activities of AGARD and provide a forum for the discussion of matters relating to AGARD's activities.

June 1982
130 pages
December 1982
136 pages

AGARD Calendar of Selected Aeronautical and Space Meetings (July 1982 – December 1983 issue and January 1983 – June 1984 issue)

This document is published every six months, each issue covering the forthcoming 18-month period. As its title indicates, the Calendar contains details of a wide range of meetings, symposia, courses, etc., details of which were obtained from national and international organizations concerned with aeronautical and space subjects. For each entry is given the date, location, title and sponsor, keywords (indicating the main topics to be covered), and a contact code for enquiries. Distribution is limited to AGARD members only.

Bulletin 82/2
August 1982
32 pages

This Bulletin reported the content and scope for the 1983 AGARD Technical Programme approved during the AGARD National Delegates Board Meeting, March 1982.

Highlights 82/2
August 1982
16 pages

See Highlights 82/1 above.

AGARD History
1952–1981
October 1982
279 pages

Earlier editions of the AGARD History which covered the years 1952–1975 proved to be of considerable interest and value to those concerned with the evolution of NATO and its institutions. In the AGARD Community, the history has been especially useful in providing members and others with an overview of AGARD's background, past activities and organisations. In response to a widespread demand for an up-dated History this new edition, which serves to commemorate the thirtieth anniversary of AGARD, includes information pertaining to events up to the end of 1981. The edition has been edited by Dr Frank Wattendorf and Mr Rolland A. Willaume.

SECTION III

AGARD MEMBERSHIP LISTS

1 JANUARY 1983

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- NATIONAL COORDINATORS
- PANEL MEMBERS
- AEROSPACE APPLICATIONS STUDIES
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III-5

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